

Ecological Restoration

Volume 36 • Number 3 | September 2018

Restoration of North American Salt Deserts

Ecological Restoration

Volume 36, Number 3



September 2018

Editorial

The Digital and the Organic

Steven N. Handel

167

RESTORATION NOTES

Can Fertilizers Increase the Seed Yield of Two Native Herb Species in the Subarctic?
Implications for Wild Seed Collection

Brittany Rantala-Sykes and Daniel Campbell

169

Ammophila arenaria as a Nurse Plant: Implications for Management of an Invasive Species

Julea A. Shaw

171

A Stepwise Approach to Increasing Ecological Complexity in Forest Landscape Restoration

Nigel Dudley and Stewart Maginnis

174

ARTICLES

Restoration of North American Salt Deserts: A Look at the Past and Suggestions for the Future

Jayne L. Jonas, M. Nikki Grant-Hoffman and Mark W. Paschke

177

Building Resilience in Ecological Restoration Processes: A Social-Ecological Perspective

Katrina Krievins, Ryan Plummer and Julia Baird

195

Towards Increased Community-Engaged Ecological Restoration:

A Review of Current Practice and Future Directions

Helen Fox and Georgina Cundill

208

Fire as a Site Preparation Tool in Grassland Restoration: Seed Size Effects on Recruitment Success

Amy O. Alstad, Ellen I. Damschen and Laura M. Ladwig

219

Soil Seed Banks in Stock-piled Topsoils in the western Rio Grande Plains, Texas

*Mylea C. Lovell, Sandra Rideout-Hanzak, David E. Ruppert, Veronica Acosta-Martinez, Forrest S. Smith,
Paula Maywald Stumberg, Keith A. Pawelek, Anthony D. Falk and David B. Wester*

226

Floristic Development in Three Oligohaline Tidal Wetlands after Dike Removal

Brenda C. Clifton, W. Gregory Hood and Steve R. Hinton

238

ABSTRACTS

Climate Change	252	Propagation & Introduction	255
Coastal & Marine Communities	252	Reclamation, Rehabilitation & Remediation	256
Economics & Ecosystem Services	253	Species at Risk	256
Grasslands	253	Technology & Tools	257
Invasive & Pest Species	253	Urban Restoration	257
Lakes, Rivers & Streams	254	Wetlands	257
Outreach	254	Wildlife Habitat Restoration	258
Planning & Policy	255	Woodlands	258
Recently Received Titles			259

MEETINGS			260
-----------------	--	--	------------



Front Cover Feature: North American inland salt deserts are one of the largest ecosystems in the western United States. There is a growing need for restoration of this ecosystem, due to disturbance by heavy livestock use, wildfire, recreation, energy development, and invasive species impacts. In this issue, Jonas and colleagues review the current literature and survey restored salt desert sites in western Colorado, resulting in guidelines for success. Picture here, a reference site at Badger Wash, Colorado, USA. Photo Credit: Jayne Jonas.

Back Cover Features:

Top: Understanding seed germination and establishment requirements of restoration species is critical to the success of restoration projects. In this issue, Alstad and colleagues tested the establishment potential of both large- and small-seeded prairie plant species, finding that while large-seed species established at higher rates than small-seeded species, prescribed burning increased establishment of all species. Photo Credit: Amy Alstad.

Middle: Seed for restoration projects is often collected from the wild. However, some species have limited seeded output. In this issue, Rantala-Skyes and Campbell found that fertilizer does not necessarily increase seed output for two perennial herbs native to subarctic North America. Pictured here, *Potentilla anserina* (silverweed). Photo Credit: Benjamin Polowich.

Bottom: Topsoils removed for energy projects have potential to be important for soil and vegetation restoration, but little is known regarding the longevity of the seed bank in stock-piled topsoil. Lovell and colleagues assessed the seedbanks of stockpiles and found that the composition and number of seeds in the seedbanks depending on stockpile depth and sampling season. Shown here, one of the studied stock-piles of topsoil (left-hand half of the photo) left from the construction of a frac pond (back right of photo), Dimmit County, Texas, USA. Photo credit: Paula Maywald.

EDITORIAL BOARD

Scott Abella

Natural Resource Conservation LLC,
Boulder City, USA.

Steven I Apfelbaum

Applied Ecological Services, Wisconsin, USA.

James Aronson

Centre for Evolutionary and Functional Ecology
Lab, Montpellier, France.

Paulette Bierzychudek

Department of Biology, Lewis & Clark College,
Portland OR, USA.

Peter Bowler

Department of Ecology and Evolutionary
Biology, University of California, Irvine, USA.

Lindsay Campbell

USDA Forest Service Northern Research Station,
NY, USA.

Robin L. Chazdon

Department of Ecology and Evolutionary
Biology, University of Connecticut, USA.

Francisco A. Comín Sebastián

Pyrenean Institute of Ecology-CSIC, Spain.

David Drake

Department of Forest and Wildlife Ecology,
University of Wisconsin–Madison, USA.

Erin Espeland

USDA-ARS Pest Management Research Unit,
Sidney MT, USA.

Bram Gunther

New York City Urban Field Station, New York
City Department of Parks & Recreation, Bayside,
New York, USA.

Jason Hall

National Oceanic and Atmospheric Administration's
Northwest Fisheries Science Center Mukilteo
Research Station, Seattle WA, USA.

Emily Huff

Department of Forestry, Michigan State
University East Lansing MI, USA.

Francine Hughes

Department of Life Sciences,
Anglia Ruskin University, Cambridge, UK.

Basil Iannone

School of Forest Resources and Conservation,
University of Florida, Gainesville FL, USA.

Michelle Johnson

New York City Urban Field Station, USDA Forest
Service, Bayside, New York, USA.

Holly Jones

Department of Biological Sciences,
Northern Illinois University, USA.

Kristen Kaczynski

Department of Geological and Environmental
Sciences at California State University, Chico
CA, USA.

Kristy King

Natural Areas Restoration & Management
Forestry, Horticulture & Natural Resources,
New York City Department of Parks &
Recreation, Long Island City, New York, USA.

Márcia C.M. Marques

Department of Botany, Universidade Federal do
Paraná, Curitiba, Brazil.

Jill McGrady

Great Ecology Inc., La Jolla CA, USA.

David Moreno-Mateos

Basque Center for Climate change–BC3,
Basque Country, Spain.

Andrew Rayburn

Independent Consulting Ecologist, Davis, USA.

Carrie Reinhardt Adams

Environmental Horticulture Department,
University of Florida, Gainesville, USA.

David J. Robertson

Pennypack Ecological Restoration Trust,
Philadelphia PA, USA

Ted Shear

Department of Forestry and Environmental
Resources, North Carolina State University,
Raleigh, North Carolina, USA.

Greg Spyreas

Illinois Natural History Survey, USA.

Katharine Suding

Department of Ecology & Evolutionary Biology,
University of Colorado Boulder, Boulder, USA.

Alan Unwin

School of Environmental and Horticultural
Studies, Niagara College, Canada.

Dennis Whigham

Smithsonian Environmental Research Center,
USA.

Ken Yocom

Department of Landscape Architecture,
University of Washington, USA.

Kathryn Yurkonis

Department of Biology, University of North
Dakota, Grand Forks, North Dakota, USA.

Luis Zambrano González

Biology Institute, National Autonomous
University of Mexico (UNAM), Mexico.

JOURNAL STAFF

Editor: Steven N. Handel

Associate Editor: Myla F.J. Aronson

Managing Editor: Paulina A. Arancibia

Abstracts Editor: Elena S. Tartaglia

Abstracts Contributors: Elena S. Tartaglia,
Paulina A. Arancibia and Max R. Piana

Copy Editor: Kate D. Douthat

Rutgers, The State University of New Jersey

School of Environmental and Biological
Sciences: Robert M. Goodman, Executive Dean

Society for Ecological Restoration International:
Alan Unwin, Chair



Printed on 30% recycled text paper.

Ecological Restoration is published quarterly by the University of Wisconsin Press. © by the Board of Regents of the University of Wisconsin System. No part of this publication may be reproduced without the written consent of the publisher, University of Wisconsin Press. Requests for permission to reprint an article or illustration should be made directly to UW Press, 1930 Monroe St, 3rd Floor, Madison, WI 53711-2059, permissions@uwpress.wisc.edu, er.uwpress.org.

Contributions are welcome. Authors should upload their materials through *Ecological Restoration's* submission website, which can be found at er.uwpress.org. Submission guidelines can be found at uwpress.wisc.edu/journals/journals/er_submissions.html.

Authorization to reproduce material from this journal, beyond one copy for personal use or that permitted by Sections 107 and 108 of U.S. Copyright Law, is granted for a fee. For fee schedule and payment information, contact www.copyright.com; The Copyright Clearance Center, 222 Rosewood Drive, Danvers, MA 01923, 978/750-8400, Fax: 978/750-4470.

Ecological Restoration is indexed in Elsevier BIOBASE, AGRICOLA, and in CSA's Ecology databases.

Ecological Restoration is affiliated with the Society for Ecological Restoration, 1017 O St. NW, Washington, DC 20001, 202/299-9518, ser.org. Members of the Society for Ecological Restoration receive *Ecological Restoration* at a discounted rate. Please visit the UW Press Web site at uwpress.wisc.edu/journals for more information.

Ecological Restoration was founded at the University of Wisconsin–Madison Arboretum.

Advertising: Call 608/263-0534 for current rates. Advertisements or references to products by brandname or trademark do not imply an endorsement by the editors or publishers of this journal.

Ecological Restoration (ISSN 1522-4740, E-ISSN 1543-4079) is published quarterly by the University of Wisconsin Press, 1930 Monroe Street, 3rd Floor, Madison, WI 53711-2059. Periodicals postage paid at Madison WI and at additional mailing offices.

Subscriptions: Individual (please pre-pay), \$79 print and electronic, \$68 electronic only; \$40 students; \$200 businesses and nongovernmental organizations; libraries and government agencies, \$300 print and electronic, \$275 electronic only. Non-U.S. subscribers please add \$40 for foreign shipping. All correspondence regarding subscriptions, advertising, and related matters should be sent to Journals Division, 1930 Monroe Street, 3rd Floor, Madison, WI 53711-2059, USA; uwpress.wisc.edu/journals. Members of the Society for Ecological Restoration receive *Ecological Restoration* at a discounted rate.

Please visit our Web site at uwpress.wisc.edu/journals for more information.

POSTMASTER: Send address changes to *Ecological Restoration*, 1930 Monroe Street, 3rd Floor, Madison, WI 53711-2059.

Submissions

We welcome submissions to *Ecological Restoration* from any part of the world. Submissions should relate to the restoration of plants, animals, ecological communities, or landscapes. We understand ecological restoration to be a multidisciplinary and diverse effort and welcome manuscripts considering ecological, and social aspects of restoration, as well as political, economic, legal, and regulatory issues, and other subjects related to ecological restoration. Relevant topics also include techniques and tools for planning, site preparation, species introduction, undesired species control, and monitoring. Manuscripts dealing with plant or animal community composition or general ecology must relate the work explicitly to ecological restoration practice and theory. Similarly, material dealing with reclamation or rehabilitation in a broader sense, or with restoration for economic purposes—economic forestry, range management, waste disposal—must be connected to ecological restoration.

Material may be submitted for the following categories (listed as they are encountered in the Journal):

1. Perspectives
2. Restoration Notes (shorter items, < 1500 words describing project updates, events, innovative technologies, preliminary or unusual findings, thought-provoking concepts, imaginative solutions, commentary, policy reports, etc.)
3. Research articles or reviews on ecological restoration theory, experiments, socio-ecological linkages, education, restoration history, practice
4. Case studies (full length articles describing a particular restoration project or location and lesson learned)
5. Book, journal, website, or movie reviews

Authors of full-length articles or reviews should submit their material online at er.msubmit.net. Manuscripts must be submitted with a cover letter stating that the material has not been previously published, and has not been submitted elsewhere and will not be until a final decision has been reached by the editor. Questions about the online submission site, or general inquiries may be emailed to ERjournal@aesop.rutgers.edu.

Review and Editing Process

Manuscripts are reviewed externally by experts in the field. The process requires approximately four to six months. Restoration Notes are reviewed and edited in-house unless additional expertise is required to evaluate the submission.

Style

Practitioners of ecological restoration are both a core audience and source of contributions to *ER*. Contributors should use a straightforward style free of unnecessary technical terms and jargon. We prefer the active voice (for example, “We measured three trees” instead of “Three trees were measured”). Please see our Submission Guidelines at er.uwpress.org for more information.

Tables, Photos, and Illustrations

Table and Figure captions should include useful and detailed information, and should be independent of the text. Figures will be reproduced in black and white in the print version of *Ecological Restoration* (usually requiring higher contrast) and can be reproduced in color in the online version. We use color photos on the front and back covers of the journal and welcome submissions of eye-catching, informative, high-quality photographs.

Page Charges

Payment of \$50 per page is requested from authors with research grant or other institutional funds available to underwrite publication costs. Invoices will be sent after composition of pages. Authors with no grant or institutional funds do not need to pay publication costs. Ability to pay page charges is not a condition for acceptance of a manuscript.

EDITORIAL

The Digital and the Organic
Steven N. Handel

RESTORATION NOTES

Can Fertilizers Increase the Seed Yield of Two Native Herb Species
 in the Subarctic? Implications for Wild Seed Collection
Brittany Rantala-Sykes and Daniel Campbell

Ammophila arenaria as a Nurse Plant:
 Implications for Management of an Invasive Species
Julea A. Shaw

A Stepwise Approach to Increasing Ecological Complexity
 in Forest Landscape Restoration
Nigel Dudley and Stewart Maginnis

ARTICLES

Restoration of North American Salt Deserts:
 A Look at the Past and Suggestions for the Future
Jayne L. Jonas, M. Nikki Grant-Hoffman and Mark W. Paschke

Building Resilience in Ecological Restoration Processes:
 A Social-Ecological Perspective
Katrina Krievins, Ryan Plummer and Julia Baird

Towards Increased Community-Engaged Ecological Restoration:
 A Review of Current Practice and Future Directions
Helen Fox and Georgina Cundill

Fire as a Site Preparation Tool in Grassland Restoration:
 Seed Size Effects on Recruitment Success
Amy O. Alstad, Ellen I. Damschen and Laura M. Ladwig

Soil Seed Banks in Stock-piled Topsoils in the western Rio Grande Plains, Texas
*Mylea C. Lovell, Sandra Rideout-Hanzak, David E. Ruppert,
 Veronica Acosta-Martinez, Forrest S. Smith, Paula Maywald Stumberg,
 Keith A. Pawelek, Anthony D. Falk and David B. Wester*

Floristic Development in Three Oligohaline Tidal Wetlands after Dike Removal
Brenda C. Clifton, W. Gregory Hood and Steve R. Hinton

