SPECIAL SECTION

Restoration Ecology

INTRODUCTION
555  The Rise of Restoration Ecology

NEWS
556  Nursing China’s Ailing Forests Back to Health
Restoring a ‘Biological Desert’ on Borneo
559  Bringing Coral Reefs Back From the Living Dead
562  Unleashing an Army to Repair Alien-Ravaged Ecosystems
564  Addicted to Rubber

PERSPECTIVES
567  Ecological Restoration in the Light of Ecological History
S. T. Jackson and R. J. Hobbs

569  Species Invasions and the Limits to Restoration: Learning from the New Zealand Experience
D. A. Norton

571  Pollination and Restoration
K. W. Dixon

573  Soil Microbial Communities and Restoration Ecology: Facilitators or Followers?
J. Harris

575  Restoration of Ecosystem Services for Environmental Markets
M. A. Palmer and S. Filoso

>> See also Editorial p. 517; News stories pp. 525 and 526; Research Article p. 578; Science Express Reports by J. M. Rey Benayas et al. and D. M. Schulte et al.; Science Express Perspective by M. W. Chase et al.

EDITIORIAL
517  Gene Banks for a Warming Planet
M. S. Swaminathan

>> Restoration Ecology section p. 555

NEWS OF THE WEEK
522  More Bad Connections May Limit LHC Energy or Delay Restart
523  Fix Funding Agency’s ‘Original Sin,’ ERC Review Panel Demands
524  From Science’s Online Daily News Site
525  Oysters Booming on New Reefs, But Can They Survive Disease?

>> Science Express Report by D. M. Schulte et al.; Restoration Ecology section p. 555

526  Plant Bar Code Soon to Become Reality
>> Science Express Perspective by M. W. Chase et al.; Restoration Ecology section p. 555

NEWS FOCUS
528  Reshuffling Graduate Training
>> Science Podcast

530  Saving a Venemous Ghost
532  A Quest for Cosmic Karma
534  Help Wanted: 2000 Leading Lights to Inject a Spirit of Innovation

LETTERS
536  Mayas Live On
J. M. Peña-Castro
Venezuelan Science: A Professor’s Defense
J. Requena
Venezuelan Science: Government on Course
G. R. Barreto
Venezuelan Science: Making Great Strides
J. Chacón-Escamillo

527  Universities Begin to Rethink First-Year Biology Courses
527  From the Science Policy Blog

538  CORRECTIONS AND CLARIFICATIONS
538  TECHNICAL COMMENT ABSTRACTS

BOOKS ET AL.
539  He Knew He Was Right/James Lovelock
J. Gribbin and M. Gribbin, reviewed by L. R. Kump
The Vanishing Face of Gaia
J. Lovelock, reviewed by L. R. Kump

540  Wiki Government
B. S. Noveck, reviewed by B. Shneiderman

EDUCATION FORUM
541  Computing Has Changed Biology—Biology Education Must Catch Up
P. Pevzner and R. Shamir
542  Mathematical Biology Education: Beyond Calculus
R. Robeva and R. Laubenbacher

CONTENTS continued >>

COVER
Like solving a puzzle whose pieces themselves change shape, ecologists around the world are developing techniques to restore degraded and exploited ecosystems. See the special section beginning on page 555.

Photo illustration: Nayomi Kevityagala (image: Grand Tour/Corbis)

DEPARTMENTS
514  This Week in Science
518  Editors’ Choice
520  Science Staff
521  Random Samples
552  AAAS News & Notes
629  New Products
630  Science Careers
SCIENCEONLINE

SCIENCEEXPRESS
www.sciencexpress.org
Unprecedented Restoration of a Native Oyster Metapopulation
D. M. Schulte et al.
The height of oyster reefs above the river bed promotes their restoration in the Chesapeake Bay.
10.1126/science.1176516
>> News story p. 525; Restoration Ecology section p. 555

Enhancement of Biodiversity and Ecosystem Services by Ecological Restoration: a Meta-Analysis
J. M. Rey Benayas et al.
Restoration, biodiversity, and ecosystem services are positively linked in a wide range of ecosystem types across the globe.
10.1126/science.1172460
>> Restoration Ecology section p. 555; Science Podcast

Common Regulatory Variation Impacts Gene Expression in a Cell Type–Dependent Manner
A. S. Dimas et al.
Genetic variation in regulatory elements among humans affects gene expression in a tissue specific manner.
10.1126/science.1174148

Reassessing the Source of Long-Period Comets
N. A. Kaib and T. Quinn
Numerical simulations show that the inner Oort Cloud is a major source of long-period comets that cross Earth’s orbit.
10.1126/science.1172676

Barcoding of Plants and Fungi
M. W. Chase and M. F. Fay
10.1126/science.1176906
>> News story p. 526; Restoration Ecology section p. 555

TECHNICAL COMMENTS
Comment on “Remeasuring the Double Helix”
N. A. Becker and R. Everaers
full text at www.sciencemag.org/cgi/content/full/325/5940/538-b

Response to Comment on “Remeasuring the Double Helix”
R. S. Mathew-Fenn et al.
full text at www.sciencemag.org/cgi/content/full/325/5940/538-c

SCIENCENOW
www.sciencenow.org
A ‘Cloaking Device’ for Earthquakes
Plastic rings could make buildings invisible to quake waves.
New Zealand Tree Stuck in a Time Warp
Plant still harbors adaptations that protected it from a long-dead foe.
Catching a Giant Wave
New insights into tsunami behavior may help researchers better track them with radar.

SCIENCESIGNING
www.sciencesignaling.org
The Signal Transduction Knowledge Environment
EDITORIAL GUIDE: Unraveling Signaling Complexity
N. R. Gaugh and J. F. Foley
Dynamics adds to the complexity of signaling networks.

RESEARCH ARTICLE: Cell Type–Specific Importance of Ras–c–Raf Complex Association
C. Kiel and L. Serrano
Ras–c–Raf association rates affect downstream signaling in the absence of negative feedback but not in its presence.

RESEARCH ARTICLE: Comparative Analysis Reveals Conserved Protein Phosphorylation Networks Implicated in Multiple Diseases
C. S. H. Tan et al.
Comparing the human phosphoproteome to that of flies, worms, and yeast reveals insights into evolution and disease.

RESEARCH ARTICLE: Integrating Proteomic, Transcriptional, and Interactome Data Reveals Hidden Components of Signaling and Regulatory Networks
S.-S. C. Huang and E. Fraenkel
Analysis of multiple “omic” data sets with a prize-collecting Steiner tree algorithm reveals components of signaling networks that are not obvious by analyzing the data individually.

PERSPECTIVE: Understanding Modularity in Molecular Networks Requires Dynamics
R. P. Alexander et al.
Relating structure and dynamics of molecular networks remains very challenging.

PERSPECTIVE: Proteomic Revelation—SUMO Changes Partners When the Heat Is On
K. Flick and P. Kaiser
A system-level view of SUMOylation dynamics shows the importance of SUMOylation to the heat shock response.

PERSPECTIVE: The Complexity of Cell Signaling and the Need for a New Mechanics
W. S. Hlavacek and J. R. Feeder
Studies that make sense of protein networks provide approaches to cope with complex signaling pathways.

PERSPECTIVE: Dynamic Advances in NF-κB Signaling Analysis
T. Kobayashi and R. Kageyama
Cytokine stimulation of cells at different time intervals produces distinct patterns of NF-κB–dependent gene transcription.

PODCAST
M. B. Yaffe and A. M. VanHook
Science Signaling’s Chief Scientific Editor discusses complexity in signaling networks.

SCIENCECAREERS
www.sciencemag.org/career_magazine
Free Career Resources for Scientists
Perspective: How to Succeed in Big Science and Still Get Tenure
V. McGovern
You need to show that you are a serious scientist, separate from your work group.

Independent Postdocs: Early Autonomy
E. Pain
Demonstrate your independence by negotiating with advisers, seeking individual fellowships, or obtaining a junior-PI position.

Independent Postdocs: Resources
E. Pain
Here is a list of grants, fellowships, and junior-leader positions for postdocs in Europe and the United States.

SCIENCEPODCAST
www.sciencemag.org多media/podcast
Free Weekly Show
Download the 31 July Science Podcast to hear about assessing ecological restoration, rethinking graduate student funding, science in Venezuela, and more.

ORIGINSBLOG
blogs.sciencemag.org/origins
A History of Beginnings

SCIENCEINSIDER
blogs.sciencemag.org/scienceinsider
Science Policy News and Analysis

SCIENCE (ISSN 0036-8075) is published weekly on Friday, except the last week in December, by the American Association for the Advancement of Science, 1200 New York Avenue, NW, Washington, DC 20005. Periodicals Mail postage (publication No. 404460) paid at Washington, DC, and additional mailing offices. Copyright © 2009 by the American Association for the Advancement of Science. The title SCIENCE is a registered trademark of the AAAS. Domestic institutional membership and subscription (ISSN issued: 1544-7776 allocated to subscriber). Domestic institutional subscription (ISSN issued: 1005-624X) 1045. Foreign postage extra: Mexico, Caribbean (surface mail 55); other countries (air assist delivery) 585. First class, airmail, student, and service rates on request. Canadian rates with GST available upon request. GST #1254 88122. Publications Mail Agreement Number 1069624. Printed in the U.S.A. Change of address: Allow 4 weeks, giving old and new addresses and 8-digit account number. Postmaster: Send change of address to AAAS, P.O. Box 90178, Washington, DC 20090-6178. Single-copy sales: $11.00 current issue, $11.00 back issue prepaid. Includes surface postage. Both rates on request. Authorization to photocopy material for internal or personal use under circumstances not falling within the fair use provisions of the Copyright Act is granted by AAAS to libraries and other users registered with the Copyright Clearance Center (CCC) Transactional Reporting Service, provided that $2.00 per article is paid directly to CCC, 222 Rosewood Drive, Danvers, MA 01923. The identification code for Science is 0036-8073. Science is indexed in the Reader’s Guide to Periodical Literature and in several specialized indexes.
325 (5940)

Science 325 (5940), 514-629.

ARTICLE TOOLS  http://science.sciencemag.org/content/325/5940

PERMISSIONS  http://www.sciencemag.org/help/reprints-and-permissions

Use of this article is subject to the Terms of Service

Science (print ISSN 0036-8075; online ISSN 1095-9203) is published by the American Association for the Advancement of Science, 1200 New York Avenue NW, Washington, DC 20005. 2017 © The Authors, some rights reserved; exclusive licensee American Association for the Advancement of Science. No claim to original U.S. Government Works. The title Science is a registered trademark of AAAS.