

Science
[Prev](#) | [Table of Contents](#) | [Next](#)
www.sciencemag.org
Science 9 August 2002:

Vol. 297 no. 5583 pp. 950-953

DOI: 10.1126/science.1073947

• REVIEW

Economic Reasons for Conserving Wild Nature

Andrew Balmford^{1,*}, Aaron Bruner², Philip Cooper³, Robert Costanza^{4,†}, Stephen Farber⁵, Rhys E. Green^{1,6}, Martin Jenkins⁷, Paul Jefferiss⁶, Valma Jessamy³, Joah Madden¹, Kat Munro¹, Norman Myers⁸, Shahid Naeem⁹, Jouni Paavola³, Matthew Rayment⁶, Sergio Rosendo³, Joan Roughgarden¹⁰, Kate Trumper¹, R. Kerry Turner³

 Author Affiliations

¹ Conservation Biology Group, Department of Zoology, University of Cambridge, Cambridge CB2 3EJ, UK.

² Center for Applied Biodiversity Science at Conservation International, 1919 M Street, NW, Suite 600, Washington, DC 20036, USA.

³ Centre for Social and Economic Research on the Global Environment (CSERGE), School of Environmental Sciences, University of East Anglia, Norwich NR4 7TJ, UK.

⁴ Center for Environmental Science, Biology Department and Institute for Ecological Economics, University of Maryland, Box 38, Solomons, MD 20688, USA.

⁵ Graduate School of Public and International Affairs, University of Pittsburgh, Pittsburgh, PA 15260, USA.

⁶ The Royal Society for the Protection of Birds, The Lodge, Sandy, Bedfordshire SG19 2DL, UK.

⁷ UN Environment Programme–World Conservation Monitoring Centre (UNEP-WCMC), 219 Huntingdon Road, Cambridge CB3 0DL, UK.

⁸ Green College, Woodstock Road, Oxford OX2 6HG, UK; and Upper Meadow, Old Road, Headington, Oxford OX3 8SZ, UK.

⁹ Department of Zoology, University of Washington, 24 Kincaid Hall, Box 351800, Seattle, WA 98195-1800, USA.

¹⁰ Department of Biological Sciences, Stanford University, Stanford, CA 94305, USA.

 ABSTRACT

On the eve of the World Summit on Sustainable Development, it is timely to assess progress over the 10 years since its predecessor in Rio de Janeiro. Loss and degradation of remaining natural habitats has continued largely unabated. However, evidence has been accumulating that such systems generate marked economic benefits, which the available data suggest exceed those obtained from continued habitat conversion. We estimate that the overall benefit:cost ratio of an effective global program for the conservation of remaining wild nature is at least 100:1.

[↵*](#) To whom correspondence should be addressed. E-mail: a.balmford@zoo.cam.ac.uk

[↵†](#) Address after Sept. 2002: Gund Institute of Ecological Economics, The University of Vermont, Burlington, VT 05405, USA.

Responses to this article**Conservation Coin Toss**

Daniel P. Faith

Science published online 27 November 2002[Full Text](#)**Incentives to Ruin Nature Despite the Cost**

Barbara A. Ray
Science published online 15 August 2002
[Full Text](#)

The coming challenges
 Ian R. St. John
Science published online 1 October 2002
[Full Text](#)

[Read the Full Text](#)

The editors suggest the following Related Resources on *Science* sites

In *Science Magazine*

NEWS OF THE WEEK
 FOREST ECOLOGY
Satellites Spy More Forest Than Expected
 Jocelyn Kaiser
Science 9 August 2002: 919.
[Summary](#) [Full Text](#) [Full Text \(PDF\)](#)

BOOKS
 ENVIRONMENT
Gold from Green Paths
 David Pearce
Science 9 August 2002: 941.
[Summary](#) [Full Text](#) [Full Text \(PDF\)](#)

ASSOCIATION AFFAIRS
 PRESIDENTIAL ADDRESS
Science, Sustainability, and the Human Prospect
 Peter H. Raven
Science 9 August 2002: 954–958.
[Summary](#) [Full Text](#) [Full Text \(PDF\)](#)

REPORT
Determination of Deforestation Rates of the World's Humid Tropical Forests
 Frédéric Achard, Hugh D. Eva, Hans-Jürgen Stibig, Philippe Mayaux, Javier Gallego, Timothy Richards, and Jean-Paul Malingreau
Science 9 August 2002: 999–1002.
[Abstract](#) [Full Text](#) [Full Text \(PDF\)](#) [Supporting Online Material](#)

NEWS FOCUS
 AGRICULTURE
The Real Dirt on Rainforest Fertility
 Charles C. Mann
Science 9 August 2002: 920–923.
[Summary](#) [Full Text](#) [Full Text \(PDF\)](#)

LETTERS
Conserving Native Plants in China
 H. Huang, X. Han, L. Kang, P. Raven, P. W. Jackson, and Y. Chen
Science 9 August 2002: 935–936.
[Full Text](#) [Full Text \(PDF\)](#)

EDITORIAL
 EDITORIAL:
Science and Sustainability
 Alan Leshner
Science 9 August 2002: 897.
[Full Text](#) [Full Text \(PDF\)](#)

THIS ARTICLE HAS BEEN CITED BY OTHER ARTICLES:

Ecosystem services: Tensions, impurities, and points of engagement within neoliberalism
Prog Hum Geogr 1 December 2012: 758–779.
[Abstract](#) [Full Text](#) [Full Text \(PDF\)](#)

Financial Costs of Meeting Global Biodiversity Conservation Targets: Current Spending and Unmet Needs
Science 16 November 2012: 946–949.
[Abstract](#) [Full Text](#) [Full Text \(PDF\)](#)

Contributions of cultural services to the ecosystem services agenda

Proc. Natl. Acad. Sci. USA 5 June 2012: 8812–8819.

[Abstract](#) [Full Text](#) [Full Text \(PDF\)](#)

Economic valuation and the commodification of ecosystem services

Progress in Physical Geography 1 October 2011: 613–628.

[Abstract](#) [Full Text \(PDF\)](#)

Cost-effectiveness of dryland forest restoration evaluated by spatial analysis of ecosystem services

Proc. Natl. Acad. Sci. USA 14 December 2010: 21925–21930.

[Abstract](#) [Full Text](#) [Full Text \(PDF\)](#)

Biodiversity Conservation: Challenges Beyond 2010

Science 10 September 2010: 1298–1303.

[Abstract](#) [Full Text](#) [Full Text \(PDF\)](#)

The case for an ecosystem service approach to decision-making: an overview

Bioscience Horizons 1 June 2010: 188–196.

[Abstract](#) [Full Text](#) [Full Text \(PDF\)](#)

Enhancement of Biodiversity and Ecosystem Services by Ecological Restoration: A Meta-Analysis

Science 28 August 2009: 1121–1124.

[Abstract](#) [Full Text](#) [Full Text \(PDF\)](#)

Remote sensing and the future of landscape ecology

Progress in Physical Geography 1 August 2009: 528–546.

[Abstract](#) [Full Text \(PDF\)](#)

Response

Science 22 May 2009: 1015–1016.

[Full Text](#) [Full Text \(PDF\)](#)

ENVIRONMENTAL ECONOMICS: Development and Conservation Goals in World Bank Projects

Science 19 September 2008: 1638–1639.

[Abstract](#) [Full Text](#) [Full Text \(PDF\)](#)

Ecosystem Services Special Feature: Global mapping of ecosystem services and conservation priorities

Proc. Natl. Acad. Sci. USA 15 July 2008: 9495–9500.

[Abstract](#) [Full Text](#) [Full Text \(PDF\)](#)

Increased plant growth from nitrogen addition should conserve phosphorus in terrestrial ecosystems

Proc. Natl. Acad. Sci. USA 12 February 2008: 1971–1976.

[Abstract](#) [Full Text](#) [Full Text \(PDF\)](#)

Water pollution by agriculture

Phil Trans R Soc B 12 February 2008: 659–666.

[Abstract](#) [Full Text](#) [Full Text \(PDF\)](#)

The debt of nations and the distribution of ecological impacts from human activities

Proc. Natl. Acad. Sci. USA 5 February 2008: 1768–1773.

[Abstract](#) [Full Text](#) [Full Text \(PDF\)](#)

Coastal Ecosystem-Based Management with Nonlinear Ecological Functions and Values

Science 18 January 2008: 321–323.

[Abstract](#) [Full Text](#) [Full Text \(PDF\)](#)

From the Cover: Tradeoffs between income, biodiversity, and ecosystem functioning during tropical rainforest conversion and agroforestry intensification

Proc. Natl. Acad. Sci. USA 20 March 2007: 4973–4978.

[Abstract](#) [Full Text](#) [Full Text \(PDF\)](#)

Farmland Biodiversity and the Footprint of Agriculture

Science 19 January 2007: 381–384.

[Abstract](#) [Full Text](#) [Full Text \(PDF\)](#)

Economic benefits of biodiversity exceed costs of conservation at an African rainforest reserve

Proc. Natl. Acad. Sci. USA 15 November 2005: 16712–16716.

[Abstract](#) [Full Text](#) [Full Text \(PDF\)](#)

The 2010 challenge: data availability, information needs and extraterrestrial insights

Phil Trans R Soc B 28 February 2005: 221–228.

[Abstract](#) [Full Text](#) [Full Text \(PDF\)](#)

Monitoring global rates of biodiversity change: challenges that arise in meeting the Convention on Biological Diversity (CBD) 2010 goals

Phil Trans R Soc B 28 February 2005: 229–241.

[Abstract](#) [Full Text](#) [Full Text \(PDF\)](#)

ECOLOGY: The Convention on Biological Diversity's 2010 Target

Science 14 January 2005: 212–213.

[Abstract](#) [Full Text](#) [Full Text \(PDF\)](#)

Biodiversity Conservation and the Eradication of Poverty

Science 12 November 2004: 1146–1149.

[Abstract](#) [Full Text](#) [Full Text \(PDF\)](#)

Riparian deforestation, stream narrowing, and loss of stream ecosystem services

Proc. Natl. Acad. Sci. USA 28 September 2004: 14132–14137.

[Abstract](#) [Full Text](#) [Full Text \(PDF\)](#)

Economic value of tropical forest to coffee production

Proc. Natl. Acad. Sci. USA 24 August 2004: 12579–12582.

[Abstract](#) [Full Text](#) [Full Text \(PDF\)](#)

ECOLOGY: How "Virgin" Is Virgin Rainforest?

Science 16 April 2004: 402–403.

[Abstract](#) [Full Text](#) [Full Text \(PDF\)](#)

Prospects for Biodiversity

Science 14 November 2003: 1175–1177.

[Abstract](#) [Full Text](#) [Full Text \(PDF\)](#)

Wilderness and biodiversity conservation

Proc. Natl. Acad. Sci. USA 2 September 2003: 10309–10313.

[Abstract](#) [Full Text](#) [Full Text \(PDF\)](#)

Myths of the Market: Economics and the Environment

Organization Environment 1 June 2003: 168–226.

[Abstract](#) [Full Text \(PDF\)](#)

ECOLOGY: Direct Payments to Conserve Biodiversity

Science 29 November 2002: 1718–1719.

[Full Text](#) [Full Text \(PDF\)](#)