

# EARTHWATCHER



Images © Prof Patrick Nunn

## Ancient Seafarers

Excavations carried out by Earthwatch teams last year revealed fascinating new insights into the lives of early settlers on the islands of Fiji in the south Pacific. Potsherds (pottery fragments) found on Bourewa Beach, Viti Levu island, seem to show that the first settlers had left their home of Papua New Guinea far more recently than originally supposed, sailing past other islands en route to arrive in Fiji at this time. Investigations have yet to draw firm conclusions, but one hypothesis suggests that the settlers may have known the islands to be unhealthy and infested with malaria.

The earthen fragments were decorated in a style associated with Lapita culture, and were discovered on a geo-archaeological research project recently supported by Earthwatch and led by Professor Patrick Nunn.

Bourewa is thought to be the site of the first ever human settlement in Fiji, following the arrival of the Lapita cultures around 1100 BC. The Lapita spread across the Pacific islands via a series of ocean crossings of more than 1,000 miles, long before any other people seemed able to routinely cross one tenth that distance.

Exceptional finds, such as a carefully buried “jewellery box,” have shed new light on the Lapita culture. They lived largely from the ocean, in coastal settlements built on stilts across coral reef flats to optimize access to food resources. A large shell midden (a dump for

domestic waste) found at the edge of where the stilt platforms once stood suggests that Fiji’s earliest inhabitants had a shared approach to waste disposal within the community.

As a member of the Nobel Prize winning Intergovernmental Panel for Climate Change, Professor Nunn is keen to explore how the relationship between Fiji’s environment and communities has altered over centuries of climate change. He is using geological data to map the environment and coral reef ecology during the 500 years of the Lapita era. This information will be combined with studies of the shell midden to identify how changing patterns of shellfish consumption relate to predation and climate change.

Considerable effort has been made to share findings with local, national and international audiences, and in 2008 the landowners of Bourewa Beach agreed to support the future conservation of the site. Working with local organizations and government, Professor Nunn is hoping Bourewa will become the first Lapita site to be formally protected and preserved for posterity.

This project is currently not fielding volunteers.  
For opportunities to join other Cultural Heritage projects, visit :  
[www.earthwatch.org/culturalheritage](http://www.earthwatch.org/culturalheritage)  
[www.earthwatch.org/FieldReportpdf/Nunn\\_FieldReport2008.pdf](http://www.earthwatch.org/FieldReportpdf/Nunn_FieldReport2008.pdf)



## Dear Earthwatcher

In December, a group of international representatives will convene in Copenhagen for urgent climate change negotiations.

There's no doubt that climate change concerns are now at the forefront of people's minds worldwide, as has been demonstrated by the recent success of international awareness movements such as the dynamic 350.org campaign and the cautionary film *The Age of Stupid*. What's also clear is that we do not have to sit by and wait for our governments to make the next move. Each of us can act - today.

Earthwatch projects provide the opportunity to do just that. One of our key research areas is climate change – and our field research ranges from the study of melting permafrost at the Arctic's edge, to the replanting of carbon-capturing mangroves in Kenya. Scientific data is crucial in understanding how ecosystems are threatened by or adapting to climate change, and what measures must be taken in order to protect them now and in the future.

Results and outcomes of our research in all four of our research areas have been published in detailed case studies, collected together in the first annual Earthwatch Science Report. To download your copy of this excellent document, please visit <http://www.earthwatch.org/newsandevents/publications/>

Opportunities to join our 2010 expeditions are available online now, and our 2010 Expedition Guide is now available. Please Visit [www.earthwatch.org](http://www.earthwatch.org) for more information.

Sincerely,

Ed Wilson  
President and CEO, Earthwatch Institute

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Volume 28, No. 3 EARTHWATCHER is published four times a year by Earthwatch Institute, Inc., 3 Clock Tower Place, Suite 100, Box 75, Maynard, MA, U.S.A., 01754-0075; the fourth issue is the annual Research Expeditions guide. ISSN 1526-4092. U.S. PS. Publication 722230. A subscription is one benefit of membership in Earthwatch Institute, an international non-profit organization. One-year membership: US\$35 (U.S.), US\$45 (Canada), US\$50 (other overseas). Copyright © 2009 by Earthwatch Institute. Periodical postage paid at Maynard, MA, and additional offices. Postmaster: send address changes to Earthwatch Institute Membership, 3 Clock Tower Place, Box 75, Maynard, MA, 01754-0075. Phone: (978) 776-0188. Earthwatch is a trademark and a service mark registered in the U.S. Patent and Trademark Office. Printed in the U.S.

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At any one time, Earthwatch teams around the world are aided by the latest technology to ensure accurate and effective results. Find out more about how researchers use this necessary scientific equipment, made possible through your support.



### 1. North America: Live From the Field

Teachers taking part on funded Earthwatch Live from the Field expeditions enjoy the unique benefit of being able to engage students back home while still on location. Using satellite phones and conferencing technology, teachers are able to report back to their students live, and answer questions from the classrooms. Teachers also blog about their experiences, and post journals, photos, videos and lessons online. [www.earthwatch.org/aboutlive/](http://www.earthwatch.org/aboutlive/)



### 5. Easter Island: Obsidian and Carbon Dating

Earthwatch teams on Rapa Nui (Easter Island) are investigating the agricultural development of prehistoric settlers to help expand our knowledge on the rise and eventual collapse of the island's original society. Testing is being carried out at numerous household and garden locations to obtain obsidian and carbon samples for dating so that they can evaluate how the landscape was used in the past. Small thermal sensors buried at various locations in the research areas form part of an improved process for more accurate radiocarbon and obsidian hydration dating, which in turn will help establish the chronological use of the Rapa Nui landscape. [www.earthwatch.org/exped/stevenson.html](http://www.earthwatch.org/exped/stevenson.html)



### 2. Barnegat Bay, USA: Hydrophone

Earthwatch researchers in New Jersey have collected the first real data about diamondback terrapin (*Malaclemys terrapin*) hearing capabilities. The noise of a boat engine was played from a hydrophone placed in an underwater ditch, leading the turtles to swim to the surface and put their heads out of the water for 44 seconds – behavior which could place them in danger of a real oncoming boat. The findings will assist management decisions regarding both aquatic and land usage in relation to ensuring the viability of wildlife resources within the Barnegat Bay Estuary. [www.earthwatch.org/exped/avery.html](http://www.earthwatch.org/exped/avery.html)



### 3. The Bahamas: Ground-Truthing

This year, the addition of new technical tools means researchers studying the coastal environment in the Bahamas can download Global Positioning System (GPS) data into Geographic Information System (GIS) software using Google Earth-Pro's global mapping system. With this data and satellite imagery, the GIS creates a computerized map of the physical environment. "Ground-truthing" is then carried out through spot surveys in the field, to check the accuracy of the GIS map. GIS allows Earthwatch scientists to develop maps of large areas quickly, in order to look at areas which are particularly under threat from dangers such as bleaching, pollution and climate change, providing a key resource for managers and decision makers. [www.earthwatch.org/exped/sullivan.html](http://www.earthwatch.org/exped/sullivan.html)



### 4. Central America: GPS and Gravity Meter

In Nicaragua, expedition teams are using gravity meters to measure gravitational distortions associated with underground magma movements in order to construct a picture of activity patterns and help predict future volcanic activity. The measured value of gravity depends partly on the elevation of the meter, so when gravity is measured, the device's height is also observed using dual frequency GPS receivers. The overall aim of the research is to gain a better understanding of environmental effects posed by gas emissions from active volcanoes and inform effective mitigation procedures. [www.earthwatch.org/exped/rymer.html](http://www.earthwatch.org/exped/rymer.html)



### 6. Amvrakikos Gulf, Greece: Photo Identification

The nicks, scars and color patches on a dolphin's dorsal fin can be as unique as a fingerprint. This allows for a powerful, non-intrusive research method to be used extensively to study bottlenose dolphin (*Tursiops truncatus*) worldwide. Earthwatch teams are using this to ID individuals in the Gulf as part of a research project investigating the highest known concentration of bottlenose dolphin in the Mediterranean, capturing information on species abundance, movement patterns, habitat use, social organization and reproductive success. Modern photo-identification takes advantage of digital photography, offering a number of benefits compared to film, including a quicker processing of images to match them to the catalog of individuals as well as increased resolution and sharpness and low cost. [www.earthwatch.org/exped/bearzi.html](http://www.earthwatch.org/exped/bearzi.html)



### 7. South Africa: Animal Distress Calls

Scientists studying brown hyaena (*Hyaena brunnea*) in South Africa are using recordings of both the hyaena call and a distress call from prey – a pig, for example - delivered via vehicle-mounted speakers in order to monitor the region's carnivores. These nocturnal "call-ins" are played for two minutes in one direction, followed by a five-minute silence, and then repeated in several directions. Volunteers manning a spotlight scan the area looking for predator eyeshine. All observed hyaenas (and other carnivores) are counted, and time of response and distance to vehicle are recorded. Hyaena population density and relative abundance are being investigated to build a picture of overall spatial distribution. [www.earthwatch.org/exped/scott.html](http://www.earthwatch.org/exped/scott.html)

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Tweet on Twitter  
Engage on Eons.

## Thanks to you



More than 355 volunteers participated on 11 climate change research expeditions from June through September, and supporting these programs is at the heart of our annual Beat the Heat Campaign. More than 350 people followed Beat the Heat on Twitter (@tweettheheat), helping secure a challenge grant from renewable energy company First Wind for our global and

local climate change efforts. More than 175 people joined Earthwatch Scientist Dr. Peter Kershaw, host Jonathan Soroff (*Improper Bostonian*), and Earthwatch President and CEO Ed Wilson at the Museum of Science on August 13 to raise money for these vital research projects. Then, on October 17, more than 20 volunteers, including First Wind and Earthwatch

employees, helped a Boston-area non-profit, EarthWorks, plant trees and improve community green space in Boston. From the Arctic Circle to the Charles River, from Kenya's mangrove forests to a community garden, Earthwatchers helped Beat the Heat. We're grateful for your support and for the generous sponsorships of First Wind, Wainwright Bank, and S & H Construction.

## Remember To Make Your Tax-Deductible Contribution to Earthwatch by December 31, 2009

Earthwatch Institute is a registered 501(c) (3) non-profit organization; contributions from US citizens to Earthwatch Institute are tax-deductible, including your expedition contribution (except for Family Teams), your annual membership, and any additional donations. Volunteers may also be able to deduct some out-of-pocket expenses, potentially including transportation costs to and from rendezvous points, on itemized returns.

If you've been thinking about making a donation or signing up for an expedition, do so before the year ends and get the benefit on your 2009 taxes. And, be sure to check with your employer to see if your membership, donation, or hours in the field are eligible for a matching gift.

As with all tax matters, please consult your personal tax advisor on actual deductibility.

## You Count...

Our outstanding expeditions for 2010 are now available to join online. Start browsing the range of projects and expedition dates to suit you. You can also sign up to receive our fantastic new Expedition Guide for 2010. Register your interest online.

2010 Projects: [www.earthwatch.org/expedition](http://www.earthwatch.org/expedition)  
2010 Guide: [www.earthwatch.org/guide](http://www.earthwatch.org/guide)

Any questions? Call us at 1-800-776-0188 or email us at [info@earthwatch.org](mailto:info@earthwatch.org) and let us help organise your expedition of a lifetime!

## Need gear for your expedition?

Visit <http://earthwatch.newheadings.com> for hand-selected clothing, adventure gear, packs, accessories and even sunscreen from top brands.



If undelivered please return to: Earthwatch Institute,  
3 Clock Tower Place, Suite 100, Box 75, Maynard, MA 01754



Seal of approval: Earthwatch has been the rated the top volunteer expedition organization for two years running by National Geographic Society's *Adventure* magazine

# Amazon Riverboat Exploration

*Amazon Riverboat Exploration* is one of our more popular research expeditions, and it's easy to understand why: volunteers get to glide through and explore one of the planet's most stunning regions, working with multiple species, interacting with indigenous peoples, and making a real difference for conservation efforts.



We're happy to be able to offer, for the first time, a less expensive way for volunteers to join this project, via the addition of another vessel, the *Clavero*. Volunteers joining *Clavero* teams can participate for up to 66 percent less than those on teams using the *Ayapua*, a sister research vessel with more amenities. But the *Clavero* is hardly roughing it: a restored 19th Century Peruvian naval vessel, it's 24 meters long, 5 meters wide, and accommodates more than 40 passengers and crew. Each shared cabin has bunk beds and the boat has community showers, toilets, and sinks. The cabins have fans, and *Clavero* teams will be running during the cooler season. There's a large dining area serving satisfying camp-style meals and a sun deck. Get more information on this economical option and start planning your Amazon conservation adventure today at:

[www.earthwatch.org/exped/bodmer\\_clavero.html](http://www.earthwatch.org/exped/bodmer_clavero.html).