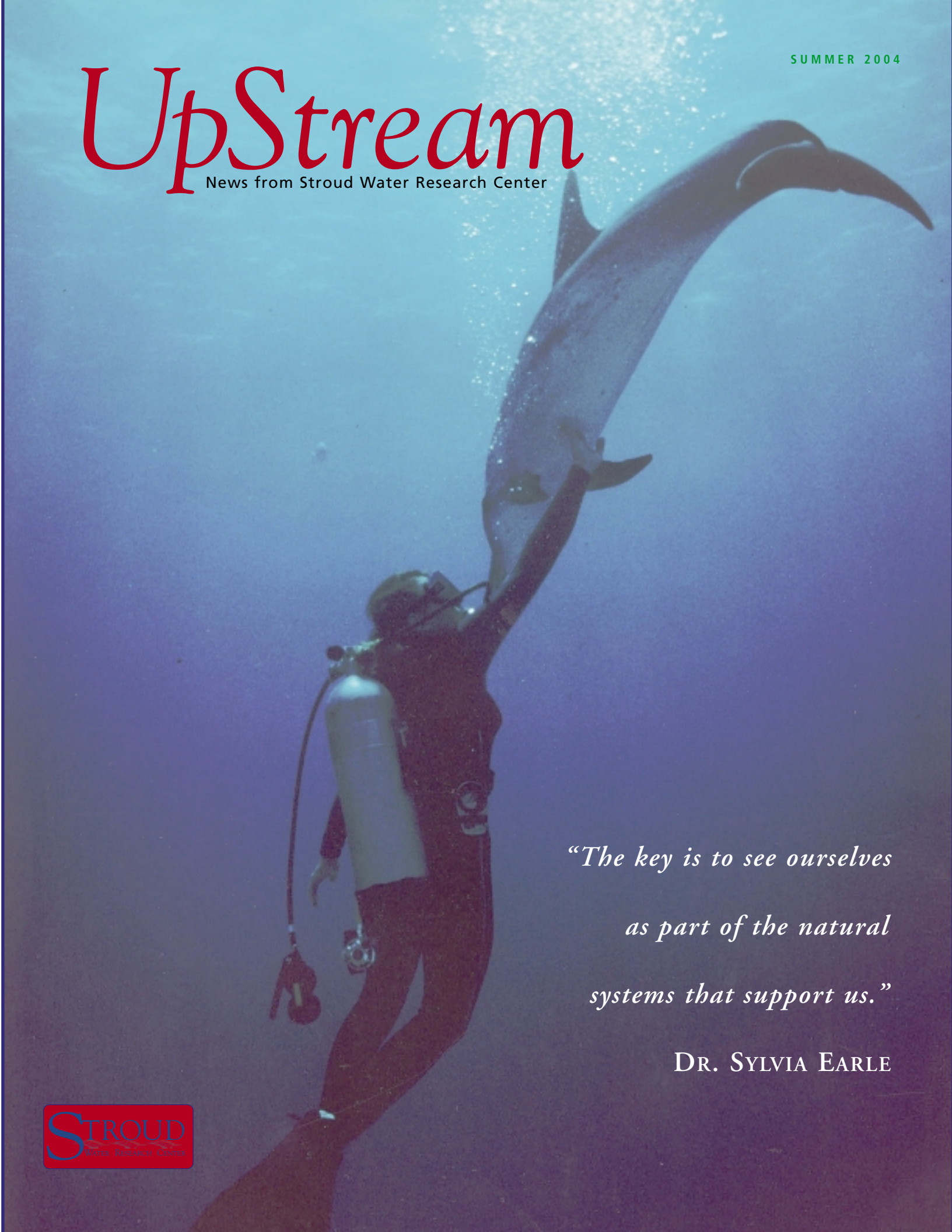


SUMMER 2004

UpStream

News from Stroud Water Research Center

A full-page photograph of a scuba diver in a dark wetsuit and mask, holding a large, silvery fish (likely a salmon) vertically in front of them. The diver is positioned in the lower half of the frame, looking up at the fish. The background is a clear, blue underwater environment with some bubbles visible. The overall tone is serene and emphasizes the connection between humans and nature.

*“The key is to see ourselves
as part of the natural
systems that support us.”*

DR. SYLVIA EARLE

UpStream

Summer 2004

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ABOUT THE COVER

Photo: Sandy & Sylvia. Behind the diver's mask is marine biologist and National Geographic Society Explorer-in-Residence Dr. Sylvia Earle who will speak at the Stroud Center's Water's Edge dinner at Longwood Gardens on Friday, October 8.

ABOUT US

UpStream is the magazine of the Stroud Water Research Center, 970 Spencer Road, Avondale, PA 19311.

The entire contents of the current UpStream are available on the Stroud Center Web site, www.stroudcenter.org, in portable document format (PDF). Past issues are also available at this site. Copyright. No. 2004-003 4M.

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Bernard Sweeney, right, gets some fly-fishing tips from Lefty Kreh

Summer Thanksgiving

FROM
THE
DIRECTOR

I was recently reminded that the Pilgrims celebrated the first Thanksgiving in October – right after a bountiful fall harvest– not the fourth Thursday of November as proclaimed by Abraham Lincoln in 1863. In that spirit, I proclaim a Summer Thanksgiving for the Stroud Center – on the heels of our bountiful spring harvest in 2004!

Unlike the Pilgrims, our harvest was not fruits and vegetables grown from seed planted on a hillside. It consisted instead of research grants grown from scientific ideas and hypotheses that we packaged as proposals and placed with various funding agencies last fall. But like the Pilgrims, our harvest will help satisfy our hunger – hunger for new knowledge about streams and rivers and for new hope for clean fresh water around the world.

And like the Pilgrims, our harvest will enable our community not just to survive, but to thrive. For we had a particularly rich spring crop. In late April the National Science Foundation awarded us a \$500,000 grant to continue our important research on the Amazon, the world's largest river. NSF funded only 9 of the 87 proposals in our category and ranked ours among the best it received. In May three grants arrived in one especially productive week: the William Penn Foundation gave us \$150,000 to continue research on the health of the Schuylkill River tributaries; the Department of Agriculture granted us \$145,000 to provide, at no cost to landowners, professional planning on reforesting wetland and streamside areas in the Red Clay, White Clay, and Tulpehocken creek watersheds; and NSF awarded us a second grant, this one for \$300,000 to continue our long-term research on the role of streamside forests in protecting healthy streams and processing pollutants.

The Stroud Center has become a fertile place thanks to the hard work of so many . . . the agencies who provide the harvest (\$), our great staff who sow the seeds (new ideas) and harvest the crops (new knowledge), and our friends who provide the farms (streams) and implements (instrumentation) that are so important to our success.

Happy Summer Thanksgiving . . . and THANKS to you all,
Bern

A handwritten signature in black ink that reads "Bernard Sweeney". The signature is written in a cursive style.

CONTACT

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'SUSTAINING THE FLOW OF KNOWLEDGE'

Ensuring the Future of Freshwater Research

Campaign for Stroud Center & Kresge Challenge

*We are well
on our way
to securing
the Kresge
Foundation's
Science
Initiatives
grant*

Since the Campaign for the Stroud Center began in January 2002, the support of individuals, foundations and corporations has been remarkable – even as we continue to face an uncertain economy. Most recently, the Longwood and Welfare foundations awarded us a total of \$750,000 that will enable us to establish a fisheries biology program, a critical piece in our freshwater research. These grants brought the total raised for the campaign to \$8.75 million, which leaves us \$2.75 million to raise to reach our \$11.5-million goal by next summer.

We are also well on our way to securing the Kresge Foundation's Science Initiatives Challenge grant we have reported on in previous issues. Since being one of only eight institutions selected for the challenge about a year ago, our staff, board and volunteers have worked unstintingly to make sure we are successful. As of this writing, we have raised \$650,000 toward the \$1,000,000 goal. When that goal is met – and the deadline is December 31, 2004 – the Kresge Foundation will award us an additional \$250,000 to create a \$1.25-million endowment fund for our instrumentation. This is an absolutely critical need for us, since we are a relatively small laboratory whose work depends on highly sophisticated equipment.

The unprecedented opportunity the Kresge grant gave us both to buy and to endow our equipment spurred our donors, volunteers, trustees and staff to action. Last December Sherman Roberts, a technician here for 25 years, led a staff effort that produced 98% participation and \$5,400 for the Challenge. Now the staff and other volunteers are urging family and friends to participate in the September 18th Run/Walk for Fresh Water, which will also benefit the Challenge.

We now turn to you - our "Friends of the Stroud Center"- to help us meet the Kresge Challenge.

Over the next few months, each of you will receive a letter asking you to give to the Kresge Challenge, and we hope that your traditional generosity will get us to our goal. To make it even easier to give, we can now accept your donations on line!

To give an on-line gift, check the progress of the Campaign, and get information about our fall events, please go to our website, www.stroudcenter.com, where virtual visitors can watch – and help – the water droplet fill up as we reach our \$1,000,000 Kresge Challenge goal.

We hope that you - our "Friends of the Stroud Center" - will join us in this critical Campaign and help us meet the Kresge Challenge in 2004!

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Stroud research in 'Nature'



*Findings
explain
role of
biofilms
in streams*

An article by Stroud Center scientists was published in the Nov. 27, 2003, issue of the British magazine *Nature*, one of the world's most prestigious science journals.

The article was based on a study of the little-known workings of biofilms, the slimy layers of microorganisms that cover rocks and other surfaces in the stream, which showed how biofilms change the physical and chemical environment of streams. By creating a physical structure that traps 300 percent more water than bare rocks, the biofilm microorganisms get better access to organic particles and organic molecules that are carried downstream.

According to the article's authors, Stroud Center scientists Louis A. Kaplan and J. Denis Newbold, former Stroud Center post-doctoral scientist Tom J. Battin, now at the University of Vienna, Austria, and Claude M.E. Hansen of the University of Innsbruck, Austria, the study shows that "biofilms are highly efficient and successful ecological communities that may also contribute to the influence that headwater streams have on rivers, estuaries and even oceans . . ."

"Our major finding," says Kaplan, "was that microbial biofilms influence how particles and solutes (dissolved molecules) move from the water to streambed surfaces where they provide energy and nutrients for microorganisms living there."

This is basic information that can be applied to understand the fate of specific particles (viruses, pathogenic bacteria and pathogenic protozoa) and organic molecules (pesticides, urban runoff, sewage treatment plant effluents) introduced into streams and rivers through human activities, says Kaplan, and could help determine impacts of such materials on drinking water sources.

According to Kaplan, theory about particle transport in streams and rivers has largely focused on sediment transport and has ignored organic particles, under the assumption that these small

organic assemblages travel all the way to the ocean. "Denis' groundbreaking research on the transport of organic particles has revealed that is not the case, and our collaboration with Tom Battin has now extended our understanding of the relevant processes associated with particle deposition," says Kaplan. "For solutes, my major area of interest, many of the same questions come into play, only the material in transport is dissolved, such as a molecule of glucose leached from a leaf that falls into the stream. Denis and I have worked closely on these questions for years, and Tom's interests, skills, and ebullient personality fit right in, making it great fun to design and carry out the critical experiments needed to test our ideas."

BOUNTIFUL BIOFILM

Besides the slippery layer in streams, biofilm forms are abundant in everyday life, including in such unsavory matter as dental plaque and the gunk that lines drain pipes. They may consist of a single microorganism species, such as a bacterium, or comprise many species of bacteria, algae, protozoa and debris. By human standards they can be detrimental (as in plaque causing tooth decay or an infection of a prosthetic device) or beneficial (as in their role in reducing pollution in streams).

Headlined "Contributions of microbial biofilms to ecosystem processes in stream mesocosms," an abstract of the article is available at *Nature's* Web site, www.nature.com.

FOR MORE ON BIOFILMS

Center for Biofilm Engineering
www.erc.montana.edu/CBEssentials-SW/bf-basics-99/bbasics-01.htm

New project targets Amazon mystery

*Stroud
Center
scientist
leads
multinational
team*

CARBON SINK

Scientists know how much carbon dioxide is released from the burning of fossil fuels and they can account for about 70 percent of what happens to it. Finding the remaining 30 percent, known as the missing carbon sink, is a mystery that scientists around the world are trying to solve in the hopes that it will lead to a better understanding of global warming.

Stroud Center scientist Anthony Aufdenkampe is the principal investigator of a multidisciplinary research team that recently won a \$498,774 National Science Foundation grant for a study in the Amazon that could help unravel the mystery of the missing carbon sink.

The study centers on a hypothesis that a significant part of the missing carbon sink is buried in deep mud beds deposited by rivers along their floodplains in the foothills of the Andes Mountains. Contrary to the conventional thinking that floodplain sediment is deposited gradually over the years, Rolf Aalto of the University of Washington, a geologist on the team, found in his recent groundbreaking study that the floodplain sediment in the Andes foothills is deposited in enormous amounts during exceptionally heavy storms and flooding that occur about every eight years. These big storms are associated with La Niña, the cold phase of Pacific Ocean temperature changes that affect global climate. (The better-known El Niño is the warm phase).

Under normal conditions leaf litter, logs and other organic matter remain on the soil surface where they soon decompose to produce, among other things, carbon dioxide that is emitted into the atmosphere. But during the cataclysmic La Niña storms, massive amounts of organic material – including huge chunks of hillside forests – slide into the rivers and are

quickly washed downstream. Aufdenkampe and Aalto hypothesize that at least 50 percent of the organic material gets buried along with mineral sediments in the floodplains in the foothills, where, in the words of the project proposal, it is preserved in “deep storage” below the zone of efficient oxidation and exchange with the biosphere. As a result, this buried carbon does not return to the atmosphere as it otherwise would have.

The research team hopes to find the missing carbon in these deep carbon graveyards in the Amazon Basin and to show that it originates from the upstream hill slides that are washed down during the La Niña floods. Over the next three years they will look at the issue from the perspectives of their various fields of expertise.

Aufdenkampe will seek to determine how much carbon is preserved in the deep floodplain sediments and the mechanisms of that preservation. He will also study the source of the carbon higher up in the Andes, where large chunks of land and forest are swept away during the floods. Aalto will study the age of the buried carbon deposits and the length of time they have been buried. Besides on-site fieldwork, the team members will also analyze satellite images to create digital maps of the earth movement from the sources to the floodplains.



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Other members of the team are:

- ◆ David Montgomery of the University of Washington, an expert in geomorphology, the study of land forms;
- ◆ Peter Hernes of the University of California, Davis, an expert in organic matter cycling in aquatic systems;
- ◆ Thomas Dunne of the University of California, Santa Barbara, an expert in geomorphology with extensive experience in the Amazon; and
- ◆ Charles Nittrouer of the University of Washington, an expert in sediment transport and geological processes.

The team will be collaborating in South America with experts at France’s overseas research institute, Institut de Recherche pour le Développement, which has labs and offices throughout the Amazon region.

Aside from the scientific possibilities, Aufdenkampe said he is also excited about the fact that the NSF proposal was funded in full. It was one of only nine of the 87 proposals that received funding and one of only two that was given the full amount requested. Rachael Craig, NSF’s program officer, told Aufdenkampe that it was extremely unusual for such a young team to out-compete so many seasoned and well-established researchers and that the review panel was very impressed by this feat.

This is the first grant a Stroud Center scientist has received from the NSF’s Earth Sciences Division’s Integrated Carbon Cycle Research Program, which is funded only every two years.

Aufdenkampe will spend about a month a year for the next three years in the upper Amazon basin in Bolivia, Peru and Brazil.

Water key to protect Costa Rica diversity

Stroud
Center
reaffirms
commitment
to tropical
stream
research

It is a remote, unspoiled place, perched on the continental divide and reachable by a 10-mile dirt road so deeply rutted that the sturdiest 4-wheel-drive vehicles find it challenging in the dry season and often impassable when it rains.

At the end of the road lies Estacion Maritza, for the past 15 years the Costa Rican base camp of the Stroud Center's effort to understand tropical stream ecosystems. Its scattered buildings sit in the shadow of the Orosi Volcano to the northeast, and from the main house you can look west to the Gulf of St. Elena and the Pacific Ocean beyond. There is little to block the view, other than the ant-sized trucks moving along the Pan American Highway in the distance and the abandoned estate of televangelist Jimmy Swaggert, whose house, like his career, is now a ruin.

Yet as remote and inaccessible as Maritza may at first appear, it abounds with the life of the tropics. Some – the monkeys and birds overhead – are avidly sought by human visitors; others – the night-calling scorpions and well-camouflaged snakes – are as eagerly avoided.

On June 25th of this year it was also alive with human visitors, as representatives from the Stroud Center and from Guanacaste Conservation Area (ACG), the national park in which Maritza is located, met to discuss the future of the station and of the research and education programs it has nurtured.

The meeting, which was scheduled

for 8:30 a.m., got under way a little after 10. Such delays are not especially unusual in Costa Rica, but this time the late start was attributable to the fact that a van full of fourth grade students had got stuck on the long road up. When the representatives of ACG finally arrived at the station, after helping free the van, their olive uniforms were splattered with mud.

By 10:30, when the last two ACG people arrived, their number totaled 12, while the Stroud Center was represented by director Bern Sweeney, board members Bernard David and Steve Stroud (who lives in Costa Rica), Rafa Morales, the on-site manager and researcher, and Bern's assistant, Jamie Blaine.

The discussion, which was carried on in Spanish to the bewilderment of some of the participants, centered on the proposal to have the Stroud Center, through its Costa Rican affiliate, enter into a long-term agreement with ACG to manage the area around the station and to assume responsibility for protecting its lands and streams. This arrangement would relieve ACG of an administrative burden and provide it a steady source of income, and it would enable the Stroud Center to play a more direct role in helping to preserve a place that has become a critical incubator for understanding tropical stream ecosystems.

Stroud Center scientists have been studying the Maritza streams since 1988. Their methods and purpose have

been much the same as those they have followed on the White Clay Creek which flows past their laboratory in southeastern Pennsylvania:

- ◆ to acquire a fundamental understanding of the structure and function of tropical stream ecosystems;
- ◆ to create, from the relatively clean waters at Maritza, a baseline for gauging the extent of pollution in other streams and for assessing changes in their conditions over time; and
- ◆ to catalogue the aquatic biodiversity of Costa Rica's streams.

In addition, Maritza has become a valuable research facility for visiting scientists, the site of programs for school-children from both the area and abroad, and a component of Costa Rica's nationwide conservation efforts.

Costa Rica, although only the size of West Virginia, contains 5 percent of the world's species. And the country has taken significant steps to protect that diversity. With over a quarter of the landscape under some form of environmental protection, Costa Rica's efforts to preserve its rich biological heritage provide a forceful contrast to current U. S. policy directions with regard to clean air, clean water and endangered species.

But there are strong countervailing pressures in a country in which 20 percent of the people live in poverty and the government is straining to deal with massive



deficits. Because it has not had a history of rigorous environmental regulations, raw sewage and other pollutants are still dumped directly into many of its streams and rivers; and the waters of the Rio Torres, which runs through the capital of San Jose, are as polluted as any in the world.

With tourism now the nation's primary economic activity, however, and thousands of people coming annually to experience Costa Rica's natural wonders, the tourist industry is demanding stronger regulations to combat such environmental ills as polluted beaches and eye infections picked up by river rafters.

In particular, said Roderigo Gamez, founder and chairman of INBio, the center for research and education in Costa Rica's biodiversity, "we are convinced that water is the key to conservation . . . and to biodiversity." But, the former professor of biology continued, "conservation is no more just a scientific issue. It is a human issue, and in everything we do [at INBio], we include the human dimension."

This reality was restated in different ways by both Carlos Manuel Rodriguez, the country's Minister of Environment



who, serendipitously, spent his honeymoon at Estacion Maritza, and by Dan Jansen, the University of Pennsylvania professor and McArthur “genius award” recipient, who has become a legend for his unrelenting drive to create a permanent refuge for Costa Rica’s biodiversity in the ACG.

Rodriguez said that water is now Costa Rica’s “number 1 issue,” and the recognition that streams reflect the

health of the entire ecosystem has brought with it a new appreciation of the value of the Stroud Center’s work.

Over the past 16 years, Stroud researchers have discovered that tropical

streams differ in important ways from temperate ones, findings that have significance not just for Costa Rica, but for the world. Indeed, the decision by the editors of the *Journal of the North American Benthological Society* to devote an entire issue in 1995 to highlighting tropical stream ecology and the Stroud Center’s work in Costa Rica has stimulated research on tropical streams and rivers across the globe.

And Stroud research has spread beyond the banks of Costa Rica’s

streams. In the late 1990s, for example, scientists found traces of pesticides in what they had thought were the pristine waters of Estacion Maritza. They then took samples from nearby soil and trees and found similar concentrations, from which they determined that the contamination was arriving with rain borne by clouds blowing from fruit plantations in the Caribbean and from as far away as Africa.

While a formal agreement on the future of Maritza was not finalized at the June meeting, the Stroud Center is dedicated to the long-term protection of Estacion Maritza and its tropical research program. To this end it has created a Costa Rican non-governmental organization to oversee its efforts in the country. It has also dedicated \$700,000 in its current capital campaign to permanently endow its work there. And it is applying to the National Science Foundation for long-term funding to continue its studies of Maritza’s streams.

Because it agrees with INBio, that “today’s students are tomorrow’s stewards,” the Stroud Center is also seeking funding for innovative education programs that will promote direct exchanges between students in Costa Rica and in the United States.

Finally, the Stroud Center has reaffirmed its commitment to protect Estacion Maritza as a critical environment in its own right and as an invaluable laboratory for understanding the dynamics of natural stream and river ecosystems, which, in turn, leads to an understanding of polluted tropical waters and ways to ameliorate their conditions.

The Stroud Center has reaffirmed its commitment to protect Estacion Maritza as a critical environment in its own right and as an invaluable laboratory for understanding the dynamics of natural stream and river ecosystems.

NSF renews funding for White Clay study

*Long-term
project
provides
valuable
research and
promotes
public
understand-
ing of
freshwater
ecology*

The National Science Foundation has renewed funding for another five years for the Stroud Center's continuing study of White Clay Creek watershed.

Accomplishments during the first five years of NSF funding, including 24 peer-reviewed publications and training for 43 undergraduate interns representing 22 institutions, were an important consideration in the renewal decision.

The \$300,000 grant is part of the NSF's Long-Term Research in Environmental Biology program, better known by its acronym LTREB. All the Center's research sections, as well as the education department, are involved in the project, which is managed and coordinated by senior research scientist Louis A. Kaplan. The study area, much of which is protected by conservation easements, forms an experimental ecological reserve of about 1800 acres in the upper watershed of the East Branch White Clay.

Both the state and federal governments have recognized the importance of the Center's work on the stream: Pennsylvania has officially designated the east branch an Exceptional Value stream, the state's highest classification; and four years ago the U.S. Congress proclaimed White Clay Creek part of the nation's Wild and Scenic Rivers System. As a result, the White Clay now serves as an Exceptional Value reference site for the state and a standard for other Wild and Scenic River sites across the nation.

The study watershed comprises a mixture of land uses, from cultivated farmland and stock grazing fields to 100-year-old woodlands and younger riparian woodlands at various stages of reforestation. The data collected over the last 37 years have created a foundation from which Stroud researchers seek to understand fundamental issues of stream

dynamics and to evaluate long-term patterns of environmental change. For example, improvements in stream quality that accompany the restoration of forests and the introduction of agricultural best-management practices can be tracked by comparing water chemistry and biological diversity over time.

In addition, according to the Center's proposal to the NSF, "LTREB funding will help the Stroud Center promote public understanding of freshwater ecology through education programs, conservation leadership, and professional service." Basic research on White Clay Creek provides essential information for the Center's education programs, which were presented to 9,285 students and hundreds of teachers during the first five-year LTREB funding period. The LTREB-funded research also provides material for the five courses Stroud scientists teach at the University of Pennsylvania.

White Clay Creek is perhaps the most intensively studied stream in the world. Since the Stroud Center's founding almost 40 years ago, its scientists have used the watershed as an incubator for hypotheses that they and others then tested in streams and rivers throughout the continent.

Currently, LTREB research provides an ongoing evaluation of best management practices in row crop and livestock agriculture, and its data is used to predict the time frame for ecological recovery following the application of those land-use practices. According to the NSF proposal, demand for the Center's expertise in riparian zone restoration projects, coupled with its active approach to enlisting landowners in tree planting programs funded by county, state and federal sources, directly impacts the larger community in the White Clay basin and beyond.

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Youth Summit learns about streams

The Stroud Center’s Christina Medved and Vivian Williams spent an invigorating few days teaching workshops and making contacts at the Jane Goodall Institute’s Roots & Shoots North American Youth Summit in Cape Cod in May.



Roots & Shoots chapters from across North America focused on the environment at the four-

day annual summit. In addition to workshops, participants plunged into the Cape’s outdoors, kayaking, rock climbing and whale watching.

In Medved’s workshop students explored the “fascinating world of aquatic insects and learned how they are used as clues to determine the health of your waterway.”

With the help of the Leaf Pack Experiment Stream Ecology Kit originally developed by the Stroud Center, Williams demonstrated the interaction between trees and healthy streams in a workshop for teachers and other adult leaders. She also gave out free kits, which were donated by the

LaMotte Co., the national distributor of the Leaf Pack Kit.

The summit included a “public day” in the Provincetown Town Hall, where the Stroud Center’s display was prominent among the many exhibits and events. The day ended with a parade through the town’s main street with the Roots & Shoots students carrying large puppets.

Medved said they had a wonderful time spreading the word about Stroud’s work and making connections with Roots & Shoots leaders across the country. She said she has subsequently received lots of positive feedback from teachers about both workshops.

The summit ended with an appearance by Roots & Shoots founder Jane Goodall, popularly known to Roots & Shoots members as Dr. Jane.

The Davenport Foundation helped fund the Stroud Center’s participation in the summit.

◆ *Williams is the Stroud Center’s Education Programs Manager and Medved is the Leaf Pack Network administrator.*

*Jane
Goodall’s
Roots &
Shoots
explore
fascinating
world of
aquatic
insects*



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SWEENEY WINS EXCELLENCE AWARD

In April, Bernard Sweeney, Ph.D., director, received the 2004 “Alumni Citation for Excellence Award” from the Archbishop Wood Alumni Association in recognition of his outstanding community service and scholarship. Sweeney attended the Warminster, Pa. school from 1964 to 1968.



WELCOME ABOARD

We are proud to welcome three new board members for 2004. They bring new talents and perspectives to our board as we complete our capital campaign and begin planning for the future.

Mayra Bonilla

President and Owner, Audiovise, S.A., Video & Multimedia Productions, Costa Rica. Former Director, Audiovisual Department, University of Costa Rica, Liaison, Asociacion Centro de Investigasion Stroud, Costa Rica.



Anne Stroud Hannum

Trustee, Brandywine Conservancy, Environmental Committee. Former Trustee, Upland Country Day School, vice president, 1997-2002. Former Trustee, Episcopal School, New York, N.Y.

Aldo A. Morell

Director, DuPont Safety, Health, & Environment Excellence Center. Former Trustee, Land Trust for the Mississippi Coastal Plain. Former Board Member, American School of Tampico. Former Board Member, United Way of South Mississippi. Former President, Gulf Coast Economic Development Council.



STROUD SCIENTISTS AT NABS CONFERENCE

Stroud Center scientists presented nine papers and were a major force in the discussions as this year’s North American Benthological Society conference at the University of British Columbia in Vancouver, Canada.

The scheduled presentations were made by Dave Arscott, Tom Bott, Dave Funk, John Jackson, Lou Kaplan, Erika Kratzer, Denis Newbold, Bern Sweeney and Patty Zaradic.

SUMMER INTERNS

Entomology

Deirdre Bowers - West Chester University

Ashley D'Antonio - Penn State University

Will Dixon - Roanoke College

Katie Hill - Messiah College

William Hohman - Gettysburg College

Joanna Huxster - University of Richmond

Angela Jackson - University of Maryland

Bryan Kondikoff - Millersville University

Eric Lundquist - University of Pennsylvania

Chelsea Lucas - University of Maine

Tracee Lynn Mosch - Dickinson College

Stephen Moyer - Millersville University

Arthur Walker - West Chester University

Krisztian Varsa - University of Delaware

Organic Biogeochemistry

Katharine Bente - Kenyon College

Greg Gromadzki - Oklahoma State University

Organic Geochemistry

Amy Krueger - West Chester University

Ann Nakai - West Virginia Wesleyan College

Harleen Kaur - Youngstown University, Ohio

Microbiology

Michael Hartshorne - West Chester University

Burley Vannote - Penn State University

NEW STAFF since fall 2003

Jessica Auman - Organic Geochemistry

Christopher Cain - Microbiology

Aaron deLong - Watersheds

Patricia Zaradic - Research Associate

Linda Carter - Organic Geochemistry



BBC FILMS FUNK'S FAMOUS FLIES

A BBC crew recently filmed dance flies on the White Clay Creek for "Life in the Undergrowth," the next David Attenborough television series.

The flies, which are about the size of mosquitoes, are known for their mating ritual during which the females blow up their abdomens to attract males. The flies' unique behavior was brought to public attention about five years ago in a paper written and illustrated by the Stroud Center's Dave Funk and Douglas Tallamy, a colleague from the University of Delaware. After the paper was published in the February 2000 issue of *Animal Behavior*, it was reviewed by the prestigious British magazine *Nature*.

According to Funk, the BBC crew "got some good footage" of long-tailed dance flies (*Rhamphomyia longicauda*) near the foot-bridge just north of the Stroud Center.



The BBC film crew, above, spent several days at the Stroud Center focusing their close-up lenses on the mosquito-sized female dance fly, left, who inflates her abdomen to attract males.



KENYAN VISITORS

Wangari Maathai and her daughter Wanjira visited the Stroud Center to discuss a collaborative effort to educate rural Kenyans about the importance of stream habitats.

NO SHOW



Millions of *Magicicada* like the one above awakened from their 17-year subterranean slumber to inundate many areas of the northeastern United States, But they failed to make an appearance in the Stroud Center woods.

Helping to win race for Kresge Challenge

*Run sets
the pace
for a
day of fun*

On Saturday, Sept. 18, join us at the ninth annual Upstream Festival and second Stroud Center 5K & 1M Run/Walk for Fresh Water. Start the day with a run in an officially sanctioned 5K or do a fun one mile walk/run through the beautiful back roads of Chester County that surround the Stroud Center.

After the run, or if you prefer a more cerebral morning, experience the Stroud Center in action by touring our labs and meeting our scientists and participating in family learning activities.

Encounter some of the 300 species of insects and 20 species of fish that call White Clay Creek home. “See” what you can’t see in streams through the eyes of our microbiologists. Watch the dynamics of a flume in action with its many surprising passengers. Be a molecular sleuth – tracers of pollution will astonish you. Help our scientists collect the various samples they need and then help prepare and analyze them. Hear about Stroud’s work from the Amazon to New York City.

Buy native plants and wander the grounds of the Stroud Center, all to the bluegrass sounds of the White Clay Tributary Band. Enjoy crafts and family activities including a book-signing by a children’s book author still to be announced. A great day will be had by everyone of all ages!

WATER’S EDGE FEATURES SYLVIA EARLE

*‘Her Deepness’
brings passion
and knowledge
of the sea to
Stroud’s
special
annual event
at Longwood*

On Friday, Oct. 8 the Stroud Center is proud to bring famed marine biologist and National Geographic Society Explorer-in-Residence Dr. Sylvia Earle to Longwood Gardens for the second annual Water’s Edge lecture and dinner.

Also known as “Her Deepness,” Sylvia Earle has lived for weeks at a time on the seabed, given her name to marine forms, and dived deeper and more often than practically anybody else on earth.

She continues a love affair with the underwater world that began when, as she puts it, “I was swept off my feet by a wave when I was 3 and have been in love with the sea ever since.” Not content to simply explore the sea, Dr. Earle is passionate about trying to save it. The object of her affection requires love of a special magnitude and magnanimity – and her stories are spellbinding.

The program will take place in the Pavilion, followed by cocktails and hors d’oeuvres in the Orangery while Dr. Earle signs books in the Silver Garden. Dinner will follow on the reflecting pool in the Exhibition Hall. After a decadent dessert buffet, the action moves to the Terrace for Longwood’s famous fountain display that will cap the evening.

Tickets are \$350 per person, \$150 of which is a tax-deductible donation. This year’s proceeds will help us meet the Kresge Foundation Science Initiatives Challenge Grant, which will enable us to create an endowment for the instrumentation that is so critical to our research. Our goal for this event is to raise \$100,000.

Every \$1 donated is worth \$1.25! Please join us at the Water’s Edge and help us meet the Challenge and enjoy a beautiful, enlightening evening with Sylvia Earle.

FALL CALENDAR

SATURDAY, SEPT. 18

9 a.m. – 1 p.m.

At the Stroud Center

2nd annual Walk/Run for Fresh Water &
9th annual Upstream Festival

\$12 pre-registration

\$15 day-of-run registration at 8:30 a.m.

Admission to the festival is included in the
registration to the Walk/Run

Or just attend the festival - \$5 a car

SATURDAY, OCT. 2

10 a.m. – 5 p.m.

Chester County Day Tour at the Stroud Center

Stroud is proud to be one of the sites on the
2004 Chester County Day Tour.

Call for ticket info: 610-431-5301

All proceeds benefit the Chester County
Hospital



FRIDAY, OCT. 8

6 p.m. – 10 p.m.

At Longwood Gardens

"The Water's Edge" featuring Dr. Sylvia Earle,
marine biologist and National Geographic Explorer

Lecture, booksigning, cocktails,

Dinner and fountain display

Tickets: \$350 per person (\$150 tax deductible)

Proceeds benefit the

Kresge Science Initiative Challenge

Sunday, Nov. 7

Gates open at 11 a.m. for the 70th Running of the
Pennsylvania Hunt Cup

Family activities, harvest snacks, music – all in a
warm picnic tent to enjoy between races. Explore
the missions and programs of the Stroud Center,
Natural Lands Trust, Cheshire Land Preservation
Fund, Brandywine Valley Association and
Brandywine Conservancy, and celebrate the protect-
ed lands and waterways of Chester County.

For information call: 484-888-6619



*As a tribute to
your generosity...*

YOUR
gift

TO FRESH WATER

Stroud Water Research Center

- A special gift of \$500 made to the Kresge Challenge, in addition to your gift to the 2004 Annual Fund, will place your name on a donor recognition wall to be permanently installed at the entrance of the Stroud Center.
- A total gift of \$250 with at least \$125 allocated to the Kresge Challenge will place your name on a donor board to be displayed for one year in the lobby of the Stroud Center.
- A gift of any size to the Kresge Challenge as well as to the 2004 Annual Fund will be listed in the annual review.

All donors are **Friends of the Stroud Center** and receive mailings and invitations to Stroud Center events.

*We thank you for
your support.*



SUSTAINING *the*  *of* KNOWLEDGE

Ensuring the Future of Freshwater Research

During this Capital Campaign we are asking you to acknowledge the critical need for gifts to both the Annual Fund and the Kresge Challenge. Annual Gifts are crucial to meet current ongoing expenses as well as to provide flexible dollars for new opportunities. Endowment Gifts to the Kresge Challenge provide financial stability and secure the future of our scientific research.

Please indicate the allocation you choose and hopefully, if possible, you will increase your total support.

Annual Gifts are crucial to meet **current** ongoing expenses as well as to provide flexible dollars for new opportunities.

2004 Annual Gift

- \$25+ Every Drop Counts
- \$50+ Rainmakers
- \$100+ Headwater Sponsors
- \$250+ Tributary Patrons
- \$500+ Streamkeepers
- \$1000+ Riverwatchers
- \$5000+ Watershed Protectors
- \$ Other

Endowment Gifts to the Kresge Challenge provide financial stability and secure the **future** of our scientific research.

Kresge Challenge Gift

- \$25+ Every Drop Counts
- \$50+ Rainmakers
- \$100+ Headwater Sponsors
- \$250+ Tributary Patrons
- \$500+ Streamkeepers
- \$1000+ Riverwatchers
- \$5000+ Watershed Protectors
- \$ Other

ENCLOSED PLEASE FIND
 MY TOTAL GIFT OF
 \$

DATE

I would like my gift to remain anonymous

NAME(S)
(As you wish it/them to appear on the donor list)

ADDRESS

CITY STATE ZIP

PHONE (H) (W)

E-MAIL

Please make checks payable to the Stroud Water Research Center.

A copy of the Stroud Water Research Center's official registration may be obtained from the Pennsylvania Department of State by calling toll free, in Pennsylvania, (800) 732-0999. Registration does not imply endorsement.

For further information, please call (610) 268 2153 x230.

*Thank you for being a
 "Friend of the Stroud Center"*

STROUD CENTER
5K & 1M RUN/WALK
FOR FRESH WATER
&
UpStream Festival

SATURDAY, SEPTEMBER 18, 2004
9 a.m. – 1 p.m.
www.stroudcenter.org

To benefit the campaign for
the Stroud Center's race to win
the Kresge Foundation Challenge

Register at: races2run.com



UpStream

NEWS FROM THE STROUD WATER RESEARCH CENTER

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STROUD
WATER RESEARCH CENTER

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