GEOGRAPHY

Ecosystems at Risk

Article No.1	“Rothschild heir finds plastic the real ocean menace”
Source	Newspaper Article
Date	18th July, 2010
Author	Deborah Smith (Science Editor)
Location of the Ecosystem	Pacific Ocean

Summary:

David de Rothschild, heir to the Rothschild Banking Dynasty has been sailing from San Francisco to Sydney in a boat made of 12,500 reclaimed plastic bottles, in order to “highlight the problem of plastic rubbish ending up in the ocean”.

The human induced modification on the oceans of today is the poisonous effect that plastic has on oceanic food chains. Whilst the material floating at the top may seem like an issue, the real problem is below the surface. Salt and sunlight degrade and wear down the majority of plastic into tiny pieces that float just under the water’s surface. Marine wildlife ingests these plastic bits, and once accumulated, they act like a “toxic sponge”, poisoning and killing the creatures internally. Not only that, but it introduces a potential health risk to humans, who eat seafood which has been poisoned by plastic, and are made ill as a result.

Steps towards managing this issue involve the banning of plastic bags across a number of industries (such as supermarket chains), and the removal of Styrofoam in circulation. However, the biggest management strategy is educating people in the value of potential waste, with people being encouraged to reuse plastics over and over.

Article No.2	“Prozac Pollution Making Shrimp Reckless”
Source	Online Article
Date	16th July, 2010
Author	Kate Ravilious
Location of the Ecosystem	Worldwide Estuaries

Summary:

Remnants of (anti-depressant) drugs being flushed into fresh, coastal waterways, worldwide, are having a negative effect on shrimp populations, with new studies proving that the drugs make the shrimp easier prey.

The human induced modification has been the affect that these drugs have had on shrimp populations. Ordinarily, shrimp, such as the estuary-dwelling *Echinogammarus marinus,* stick to dark and shadowy corners of their habitats. However, after scientists exposed these shrimp to fluoxetine (a main ingredient in the anti-depressants Prozac and Sarafem), at the same levels as that of average sewage treatment waste, is has been proven that the shrimp are five times more likely to swim towards a bright patch of water, making them easier prey for fish/birds. This is likely due to fluoxetine affecting shrimps levels of serotonin; a brain chemical that alters moods and sleep patterns.

Management of this human impact involves better technology for breaking down pharmaceuticals at sewage works, and public awareness on how to correctly dispose of drugs. Also, doctors reducing the amount of prescriptions they write subsequently helps, as these drugs, once incorrectly disposed of and leached into water ways, are also suspected of creating problems for aquatic wildlife.

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Article No.3	“The Rainforest in Rio’s Backyard”
Source	Online Journal
Date	January, 2010
Author	Virginia Morell
Location of the Ecosystem	Brazil’s Atlantic Rainforest

Summary:

The Brazilian Atlantic Rainforest and its proximity to cities such as Rio de Janeiro put it at even greater risk of extinction than the Amazon, with scientists attempting to bring this rare forest back to life.

Less than 7% of the Atlantic Rainforests is left untouched today. Extensive deforestation has resulted in isolated patches of forests, and many organisms habitats destroyed. This has had a devastating effect on the variety of rare animals, birds and plants that dwell within the forest, many having reduced genetic variety, forced into inbreeding due to the small areas of patchy forest they live within, resulting in many being on the verge of extinction (e.g. the maned sloth).

In order to save these organisms from genetic inbreeding and eventual extinction, scientists and conservationists are relocating many of the animals to different patches of the forest, allowing them to meet similar organisms not related and breed with them. On a far more grandiose scale however, they have begun to grow ‘corridors’ of vegetation (both indigenous and non-indigenous), that connects each patch of rainforest, allowing it to become partially restored and allowing (formerly patch-bound) groups of species to reach others, and interbreed, saving them from extinction.

Article No.4	“Mangroves disappearing faster than land-based forests”
Source	Online Article
Date	16th July, 2010
Author	Matthew Knight
Location of the Ecosystem	Mangrove Forests Worldwide

Summary:

The destruction of the world’s mangroves is occurring over four times faster than that of land based forests, causing large issues along the coastlines of countries previously inhabited by these mangroves, such as Indonesia.

Humans are destroying these mangroves at a rate of 0.7% a year, due to mass-deforestation. This has resulted in a large number of issues along the coastlines of these affected countries. Dangerous levels of erosion have begun to wear away at sections of coastline, with strong currents shifting silt and sand without any mangroves to impede it. Higher salt concentrations in the water closer to land, has resulted in inland salinity levels rising dramatically, as the water table beneath the earth has the amount of salt within it rise. The lack of protection shorelines, previously covered by mangroves, has when hit with severe storms, tsunamis and cyclones, has been the largest issue facing countries.

All levels of administration within a government, as well as NGO’s, need to work together in the management of mangrove ecosystems, to implement protection acts, coupled with heavy penalties, and awareness programs, in order to ensure people/industries do not disturb the mangroves without the explicit permission from the countries government.

Article No.5	“Can painting mountains restore a glacier?”
Source	Online Article
Date	7th July, 2010
Author	Matthew Knight
Location of the Ecosystem	The Peruvian Andes

Summary:

Inventor Eduardo Gold is attempting to reverse the affect of global warming on the Chalon Sombrero glacier in the Peruvian Andes, by recreating conditions that will allow it to form ice again, revitalising a (up to now) extinct glacier.

The melting of glaciers has been mainly due to rapid industrialization causing global warming. Humans indiscriminately burn fossil fuels and these form pollutants within the earth’s atmosphere, trapping heat within it and increasing temperatures globally. Glaciers normally absorb 20% of the sun’s heat and reflect the remaining 80%, but due to rising temperatures, this has caused patches in glaciers to melt straight through, leaving bare earth. This causes a reversal in these percentages, further increasing the temperature and melting glaciers even more rapidly.

In order to revitalise the extinct glacier, Gold and his team created a process known as the Albedo effect: that is, painting the rocks with whitewash. Doing so means less of the sun’s rays are absorbed by these painted rocks, and as more rays are reflected away from the rock’s surface, there is a lowering of temperature on the rock surface. Having covered 170 acres so far, Gold’s aim is to reduce the temperature from 20°C to 5°C.

Prozac Pollution Making Shrimp Reckless

Antidepressant's key ingredient is flushed into coastal waters, study says.

The glass shrimp (file photo) may be one of many aquatic species harmed by antidepressants.

Photograph by David Doubilet, National Geographic
Kate Ravilious
for National Geographic News
Published July 16, 2010

There's no happy ending for shrimp exposed to the mood-booster Prozac, according to a new study.

Remnants of antidepressant drugs flushed into waterways worldwide are altering shrimp behaviour and making them easier prey, experts say.

To mimic conditions in the wild, scientists exposed the estuary-dwelling shrimp *Echinogammarus marinus* to the antidepressant fluoxetine at levels detected in average sewage-treatment waste. Fluoxetine is the key ingredient in the drugs Prozac and Sarafem.

Shrimp normally gravitate toward safe, dark corners. But when exposed to fluoxetine, the animals were five times more likely to swim toward a bright region of water, the team discovered.

"This behaviour makes them much more likely to be eaten by a predator, such as a fish or bird," said study co-author Alex Ford, a biologist at U.K.'s University of Portsmouth.

The fluoxetine likely makes shrimp's nerves more sensitive to serotonin, a brain chemical known to alter moods and sleep patterns, according to the study, recently published in the journal *Aquatic Toxicology*.

Prozac Rise May Harm Other Animals

Antidepressant use is rising rapidly—more than 10 percent of U.S. citizens, or about 27 million people, used the drugs in 2005, according to a 2009 paper in the journal *Archives of General Psychiatry.*

It's so widespread that animals other than shrimp likely suffer from these high doses of fluoxetine, the authors noted.

"We focused on shrimp because they are common and important in the food chain, but serotonin is also linked to behavioural changes in other species, including fish," Ford said.

Ford believes that many other common prescription drugs—such as anti-inflammatory drugs and painkillers—could also be causing problems for aquatic life.

But there are ways of protecting aquatic creatures from the drugs we take, Ford noted.

For instance, more public awareness about responsible drug disposal and better technology for breaking down pharmaceuticals at sewage works, among other solutions, could help to solve the problem, he said.

The Rain Forest in Rio's Backyard

In Espirito Santo, stacked eucalyptus logs await pickup. Plantations of this non-native species have replaced 7.5 million acres of forest, becoming the world's biggest source of eucalyptus pulp for paper.

Photograph by Mark Moffett
By Virginia Morell
Republished from the pages of *National Geographic* magazine

Brazil's Atlantic forest rivals the Amazon with its eye-popping array of unique plants and animals, yet its proximity to Rio de Janeiro and other cities puts it at even greater risk. Now scientists are testing an approach to answer the question: Can a rain forest be brought back to life?

"It's always like this," says Adriano Chiarello. "You know they're here, but you can't see them." The Brazilian conservation biologist bends his neck backward like a yoga master to peer at a tree's uppermost branches a hundred feet above us. Somewhere in the leafy canopy, a female maned sloth and her eight-month-old infant are hidden from view. A steadily beeping radio signal from the mother's collar has brought Chiarello to the base of the tree, but even technology has its limits. The biologist must now spot the pair the old-fashioned way: with his eyes alone.

"If they don't move, we may never see them," Chiarello sighs. "And you know, they really are sloths. They spend hours sitting, sleeping, never moving. That's what they do 80 to 90 percent of the day: nothing."

He wipes his eyes, shakes his head, then returns to his craning yoga pose. "Wait…Maybe my insult has worked. Look there—right over your head. She's braced against a branch."

I follow Chiarello's pointed finger and spy the mother's dark brown face among the leaves. She buries her face under her arm and looks instantly like a large, furred coconut or bees' nest.

"Do you see that? How she can vanish?" Chiarello asks. "For their size, they are so well camouflaged. And…wow! Now she's moving!"

For Chiarello, such a sloth-on-the-move sighting is a peak experience, the ultimate biological moment that holds the promise of new insights.

The baby sloth, looking like a Teletubby wearing a curly lambskin coat, emerges from its mother's arms. It climbs over her and then playfully—lazily—slaps at its mother's face. The mother does nothing in return. "They never respond to their babies," whispers Chiarello, adding that mother sloths neither play nor get angry with their offspring. Instead, with all the speed of a desert tortoise, the mother reaches an arm out to a nearby branch and nibbles the leaves.

Chiarello's graduate students—at the Catholic University of Minas Gerais, where he's a professor—busily take notes. We all stretch our necks, craning this way and that, to keep the sloths in view as the pair move like sleepwalking high-wire artists along the branches to the freshest leaves. Astonishingly, given the mother's 15-pound (7-kilogram) build, she and her baby hang from the pencil-thin twigs like strange, half-animated fruits.

Chiarello's "main actress," as he fondly refers to the mother sloth, is the star in his study, funded in part by the National Geographic Society, of the endangered mammals of the São Lourenço Municipal Park, a small fragment of Brazil's Atlantic forest, or Mata Atlântica as the Brazilians call it. Like many mammals here, the maned sloth has lost huge tracts of its original habitat since the first Portuguese mariners stepped ashore in April 1500. At that time the Mata Atlântica is believed to have covered about 520,000 square miles (1.35 million square kilometres), making it about one-fifth the size of the present Amazon forest 500 miles (800 kilometres) to the northwest. The rain forest hugged the coastline from the country's snout-like protuberance of what is today the state of Rio Grande do Norte to its border with Uruguay. In some places it extended inland for 300 miles (480 kilometres) or more, covering a range of habitats from coastal mangrove thickets to mountain massifs averaging 3,000 feet (900 meters) high, blanketed with broad-leaved evergreens and conifers.

Forebodingly, one of the first things the Portuguese seafarers did was to chop down a tree. They fashioned a cross from it and celebrated a Mass, claiming the land and its forest for their God and king. Over the next 500 years many more trees were felled, and the forest was transformed into cities, mines, and fields planted with sugarcane, coffee, cacao, and eucalyptus—all introduced species. Now, some 70 percent of Brazil's population lives in what was once the Atlantic forest, with most people concentrated in two of the three largest cities in South America, Sao Paulo and Rio de Janeiro.

Given that history of destruction, it's not surprising that today less than 7 percent of the Atlantic forest remains, much of it in isolated patches, some less than 6 acres (24 hectares) in size. It's as if someone broke apart a strand of pearls, then stepped on each bead. Indeed, among biological hotspots—the environmentally threatened regions of the world with the highest amount of endemism, meaning species found nowhere else on the planet—Conservation International ranks the Atlantic forest as one of the top five.

Yet within those fragments many of the Mata Atlântica's unique species, including some of the world's rarest plants, birds, and other animals, have managed to survive. Among them is the maned sloth. Like other mammals stranded here on forested islands amid a sea of agriculture and development, the sloth seems doomed to genetic inbreeding—if not eventual extinction.

"We think the sloths' genetic variation has already decreased," Chiarello says. "In the past this population was connected to those in southern Bahia and northern Rio de Janeiro. But they've been separated for at least 50 years." To determine the amount of inbreeding in the three groups, one of Chiarello's students, Paula Lara Ruiz, has launched a study of their genetic makeup.

"We may need to relocate some sloths to maintain their viability," Chiarello says. "Before we can do that, we need to know what trees they prefer, how much deep forest they need to survive."

But nailing down the particularities of sloths is only a small part of what Chiarello has in mind. Like other biologists tracking species in the Mata Atlântica, he has a far grander vision. Never mind that some of the land around the fragmented forest has the look of an abandoned bombing range, or a Sahara-in-the-making. Never mind that farmers continue to expand their eucalyptus and coffee plantations. Chiarello and a growing coterie of conservationists are determined to bring back the Mata Atlântica by reconnecting as many fragments as they can.

By linking islands of natural landscapes with corridors of vegetation, these scientists believe the Atlantic forest can be partly restored and many of its species saved from extinction. The corridors, in essence, could provide a safe passage from one island to the next, enabling isolated populations of animals and birds to meet and mix. It's an idea that has been around since the 1960s. Although there's no absolute proof that corridors ensure a species' survival, they are currently being tested around the world, with projects under way in the Netherlands, Australia, the United States, and many other countries. "It just makes intuitive sense that corridors are beneficial," says Hugh Safford, an ecologist with the U.S. Forest Service who has worked extensively in the Mata Atlântica."Any planting to restore a forest has to help."

In Brazil one goal is to develop a corridor that would link broken bits of forest along 500 miles (800 kilometres) of south-eastern coastline, including both new forest and existing agriculture. Though native trees are preferable, just about any type of tree or shrub can be incorporated into a corridor. "Animals use the coffee and eucalyptus plantations to get from one fragment to another," says Chiarello's colleague and fellow mammalogist Marcelo Passamani. Conservationists want farmers and ranchers to maintain plantings they already have and to join these with replanted stands of native trees. But is it really possible to bring back a rain forest?

"Theoretically, it can be done," says ecologist Rejan R. Guedes-Bruni, coordinator of the Atlantic Forest Program at the Botanical Garden of Rio de Janeiro. Every year since 1993, the Botanical Garden has overseen the planting of some 30,000 seedlings. "Of course, it's very difficult," she says. "But it is not too late to try this, and so we are doing it."

To get an idea of how much of the Atlantic forest has been destroyed, one has only to look at maps of the area. On many of them the forest is shown as dark splotches of green among the lighter greens and browns that depict agriculture, or the red swaths representing cities. In south-eastern Brazil, along the coastline where the Mata Atlântica is most intact, maps typically show a broad stroke of deep green. But around the city of Rio de Janeiro and in the northern state of Bahia, the darker shade gives way to large patches of olive, sage, beige, and red. In many places on the maps, only specks of the richer green remain.

In one of those specks, about 60 miles (97 kilometres) from Rio, I join Marina Lapenta, a wildlife biologist with the Golden Lion Tamarin Association, as she and her assistant search for a group of radio-collared tamarins. The speck is named the Poço das Antas Biological Reserve and covers

some 13,600 acres (5,500 hectares), about half forested. The rest will be, too, if the association has its way. Plans are afoot to connect the reserve to forested plots on nearby ranches via corridors that would nearly double the size of the tamarins' habitat here.

"All of this is secondary forest," Lapenta says, as we make our way through a tangle of vines, thorny palms, and spindly broad-leafed trees—the kind of trees and plants that sprout after an old-growth forest has been cut. Her assistant, Jadir Ramos, turns his radio antennas in a slow arc, homing in on the tamarins' signal. "They're coming this way," he says.

Right on cue, the air suddenly fills with the tamarins' high-pitched whistles, clucks, and warbles. They spy us and make a sharp alarm cry, then leap into the uppermost branches of a tree with such speed they look like flying cats. For a moment there is only a blur of red-orange, silky fur. Then curiosity gets the better of them, and they inch closer to peer down at us. "They'll get used to us," whispers Lapenta. "But they're nervous because another group is coming this way."

In the distance we hear the other group's whistles and clucks, and the tamarins turn to face the sound. Looking something like a miniature samurai warrior with his slightly Asian-tilted eyes and mane of sunset orange fur, the oldest male jumps into a neighbouring palm, positioning himself to meet the challengers as they move closer. "This is a way for females to meet mates too," says Lapenta. "Sometimes a male and female go off to form a new group."

But neither love nor war is in the cards this morning. The oldest males from each group eye each other, then resume their feeding, picking out juicy bugs from beneath the fronds' fibres. The tamarins are so at home in this setting that I have to remind myself that all the animals busily hunting, chirping, and socializing shouldn't be here—or rather, they should be here, but they came so close to extinction 40 years ago that their presence today is akin to a miracle tale. By the 1960s only 150 individuals remained in the wild. The tamarins' forest had been reduced to shreds, and ranchers still actively captured and sold the surviving primates.

"Then 20 years ago this project started," says Denise Rambaldi, director of the Golden Lion Tamarin Association. "In 2001 we celebrated the thousandth birth of a tamarin in the wild."

Supported by more than 30 Brazilian and international organizations (including the National Geographic Society), researchers have used some of the most intensive, hands-on measures in conservation biology to achieve success. Tamarins were carefully bred in several zoos in the United States and Europe, taught to forage for wild foods, then relocated to the reserve and nearby ranches that offered protection. Poachers were actively pursued, and an environmental education program was introduced—with such success that locals today pridefully ask if you've seen "their" golden lion tamarins. Ranchers, too, were given financial incentives to protect the forest and tamarins on their lands. At the same time, conservationists began to reforest the reserve.

"It's not a manufactured, 'fake' forest," emphasizes Luiz Fernando Duarte de Moraes, a restoration ecologist with the Atlantic Forest Program at the Botanical Garden of Rio de Janeiro. Fernando leads me on a tour of a young forest corridor covering about ten acres (four hectares). "The forest grows naturally. We're just giving it a hand." He shows me the willowy sprout of a jacaranda tree. "This is not one we cultivated. It's actually a very rare species. But its seeds were here in the soil. It returned on its own." The tamarins are returning too. "They're already coming into these trees to hunt. So that shows they will use these corridors. Meter by meter, we're expanding their habitat," he says.

Indeed, the success of the Golden Lion Tamarin Association is one reason conservationists have turned to corridors as the method of choice for saving the Mata Atlântica's highly endangered species. "There's so much to save," says Marcelo Passamani. "Rare birds, rare plants, the tamarins, muriquis [woolly spider monkeys], wild dogs, jaguars, peccaries, and tapirs, even little rodents."

Until the 1980s few grasped how unique the forest was. "We ignored the urgency of studying the forest before then," says Guedes-Bruni. "Partly, we felt we could study it anytime, because most Brazilians live right next to the Mata Atlântica. And part of it was our attitude. People didn't call the forest mata. They called it mato-unproductive land that needed improvement."

Thus devalued, the forest was steadily eroded. Only after researchers began to inventory its remaining species in the 1980s did they realize that the Mata Atlântica came close to the Amazon in terms of endemism. And although today's Atlantic forest is only a small fraction of the size of the Amazon, it supports about two-thirds as many mammal species—269, while the Amazon has 427. This new awareness gave birth to a growing environmental movement. In the early 1990s, when about 8 percent of the forest remained, the Brazilian government finally issued a decree banning all further cutting of native species in the Atlantic forest.

"We have some good laws," says Rambaldi. "Ranchers must keep 20 percent of the forest on their lands, for instance. But no one enforces the laws. It's true that it's now rare to see clear-cutting, but people still take a few trees here, a few trees there. That's what's destroying the last of the Mata Atlântica—this nibbling."

Farmers typically burn their fields after harvesting their crops, and these fires also eat away at the forest—and the newly planted corridors. At Poço das Antas, a few miles from where we watched the tamarins feeding in the palms, a fire had been burning for more than a week, consuming trees and shrubs.

"It takes time to change peoples' attitudes," says Guedes-Bruni. "And we need to make big changes. The problem is, the forest is being destroyed faster than we can change."

Sometimes, however, changes do come, and in unlikely ways. In the state of Alagoas, in the north-eastern part of the Mata Atlântica where barely 2 percent of the forest remains, the Serra Grande sugar company is the region's leading proponent of reforestation and conservation.
"I never expected to find a forest like this here," says Marcelo Tabarelli, an ecologist from Federal University of Pernambuco in Recife who is working with the company to increase the forest on its land. He and two of his students lead me along a boggy trail from a sunny sugarcane field into the twilight of a dense forest. "This forest has never been cut," he says. "You can tell from the size of the trees, the big liana vines, the number of bromeliads and orchids."

He stops beside one soaring tree with a girth easily ten feet (three meters) around. Bromeliads as big as truck tires splay from the tree's muscular branches, and lianas as fat as overfed pythons wind down from its sky-high crown. "I'm sure this tree is at least a thousand years old," he says. "It's remarkable to find a tree of this age anywhere in the Mata Atlântica, but especially here."

This was one of the first parts of Brazil to be settled, and most of the forest was turned into sugar plantations and cattle pastures long before a naturalist ever visited. "This is the rarest, most endangered part of the Mata Atlântica. It's like being on a scientific frontier. We're always discovering new species—frogs, bromeliads, trees, shrubs, an owl, even a bee," says Tabarelli.

Somehow, even as the land was changed from forest to an almost endless sea of sugarcane, this parcel—about 9,000 acres (3,600 hectares)—survived intact. "It's here because the sugar company needs water for its fields and generating electricity. And its managers know that forests are necessary for a healthy watershed," says Tabarelli. Altogether the company has some 27,170 acres (11,000 hectares) planted in sugarcane and another 22,230 acres (9,000 hectares) of forest.

Although the sugar company essentially saved the forest out of self-interest, it prides itself on what it has conserved. "There's forest here today because the company protected it," says José Bakker, the physical plant manager and company liaison with Tabarelli. "When I came here in 1986 the forest was like an empty house. There were a lot of trees but very few birds and mammals because

of the poaching. I wanted to bring back its inhabitants." Working with conservation groups, Bakker reintroduced capybaras into some of the forested fragments and plans to bring in tapirs and peccaries.

For his part, Tabarelli is sceptical that corridors are the answer to saving the forest here. Often, he notes, corridors are simply too narrow to be of use to animals that live in the deepest regions of a forest. "We can't wait to find out if corridors—even though they're the newest paradigm for conservation here—will save species," says Tabarelli. "We're trying some. But I think our best shot is first to increase the overall size of the forests we have. Where you have good, dense forest, you have more species." Tabarelli hopes to do that by planting trees around the fragments' edges rather than connecting them with corridors. To that end, the sugar company (in alliance with conservation organizations) is planting 130 acres (57 hectares) of forest a year.

The tragedy of the Mata Atlântica is that so much of its biodiversity has already been lost. Indeed, four animal species known to have recently become extinct in Brazil all lived in the Atlantic forest. Because of the scale of loss, conservationists agree that the Mata Atlântica will never be fully restored—no matter how many corridors are planted or fragments enlarged. "What we can do is stop the destruction to save what remains," Tabarelli says. "And increase the forest where we can."

"Yes, maybe this can be done," says the ecologist Guedes-Bruni, who admits to being pessimistic about any larger plans to bring back the Mata Atlântica. "I would never tell my students I am doubtful, because they are full of hope, and they might make a big change."

For now the students and researchers like Tabarelli are intent on deciphering from the forested fragments how a "real rain forest"—one with trees a thousand years old and stretching miles instead of acres—works. In one medium size fragment above a recently harvested sugarcane field, we hike a short way beyond the forest's edge to meet two students who've tacked paper disks to several tree trunks. They've scented each disk with the odours that different orchid species use to attract male euglossine bees.

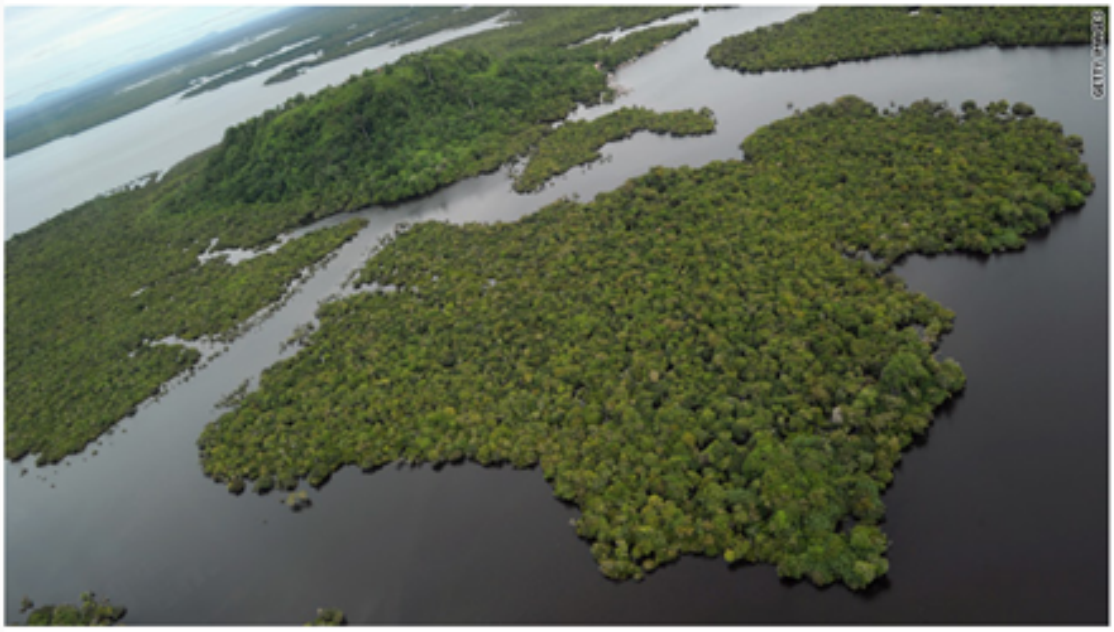
"That's how we found a new bee," says Evelise Locatelli. "It came to this scent." She opens a vial and wafts its malodorous brew toward my nose. I take a step back as a blend of mildew, stinky gym socks, and chlorine hits my nostrils. "My new bee loves it," she says, laughing as I wrinkle my nose. "Wait until you see him. He is beautiful!"

Locatelli touches more of the scent from the vial to the disk, and her newest discovery soon arrives. It zooms in straight toward the reeking disk; Locatelli's colleague captures it quickly in a butterfly net. She gently untangles this male, whose throbbing thorax is shaded cinnamon and green. "It's really his colour and small size that told us he was something new," she says. "So now we want to know, where do these bees live? How far do they travel? Do they like only the big forest, or can they live in the small bits and corridors too? Many questions!"

They're the questions every researcher in the Mata Atlântica wants to answer for his or her favourite species. It's what they need to know as they set about restringing, pearl by pearl, the broken necklace of the Atlantic forest.

Mangroves disappearing faster than land-based forests

By **Matthew Knight**, for CNN
July 16, 2010 -- Updated 1517 GMT (2317 HKT)



A mangrove forest at the Danau Sentarum National Park in West Kalimantan on Indonesian Borneo island.

STORY HIGHLIGHTS

- Mangroves disappearing faster than land-based forests, according to new U.N. report
- An estimated 35,000 hectares of mangrove have been destroyed since 1980
- Preserving mangroves can sustain local fishing and timber industries, report author says

London, England (CNN) -- The destruction of the world's mangrove forests is happening up to four times faster than the world's land-based forests, according to a new United Nations report.

A study commissioned by the U.N. Environmental Program (UNEP) reports that one fifth (around 35,500 square kilometers) of the world's mangroves -- forests straddling both land and sea -- have been lost since 1980.

Although the study reports that annual destruction has slowed to 0.7 percent a year, the authors of the "World Atlas of Mangroves" report warn that continued coastal destruction and shrimp farming could cause financial and ecologic havoc.

Studies estimate mangroves generate between U.S.$2000 to $9000 per hectare annually from fishing -- much more than the aquaculture, agriculture and tourism, which the U.N. says are the biggest drivers of mangrove loss.

Achim Steiner, U.N. Under-Secretary General and Executive Director, U.N. Environment Program (UNEP), said in a statement: "This atlas brings our attention onto mangroves and puts them up front and central, plotting where they are, describing where they have been lost, and underlining the immense costs those losses have had for people as well as nature."

Mangroves cover around 150,000 square kilometers and are found in 123 countries worldwide. The biggest concentration (21 percent) of the world's mangroves is in Indonesia, with Brazil home to around nine percent and Australia, seven percent.

Mark Spalding, lead author of the report and senior marine scientist with The Nature Conservancy, told CNN: "The value of mangroves has been hugely overlooked. Mangroves are incredibly valuable, left standing."

Preserving the environmental diversity of mangroves is essential to maintaining what Spalding calls "the real hard dollar values" for the people who live near them and depend on their survival.

Apart from providing a degree of coastal protection for communities -- there is evidence that mangroves reduced the impact of the Indian Ocean tsunami in 2004 -- mangroves are also of vital economic importance to locals.

"There are a lot of fish that depend on mangroves - mud crabs, oysters, mussels - and there are also a lot of fish that don't seem to be connected to the mangroves but actually are. These fishing industries employ a lot of people," Spalding said.

The U.N. estimates that mangrove-related species support 30 percent of all fish catch and almost 100 percent of shrimp catch in southeast Asian countries. Mangroves and associated habitats in Queensland, Australia, are thought to support 75 percent of commercial fisheries species.

The forestry aspect of mangroves is also important economically.

The wood is dense, rot and termite resistant, Spalding says, making it good for use as timber or as charcoal, among the best in the world, he said.

"It's highly productive so you can continue to harvest it, which is rare," Spalding said.

It's taken Spalding five years to piece together the "World Atlas of Mangroves," and despite the findings, he remains positive that mangroves can be preserved.

"My sense is that we can turn this around into a good story," Spalding said.

"Knowing what we know now, mangroves can be restored and help us fight climate change," he said. They are incredibly resilient ecosystems, which aren't bothered by increasing temperatures, he said.

"These are habitats that are going to be around with us if we just look after them and the economic benefits will just accrue. There has been sustainable use of mangroves in Bangladesh and other parts of Asia for over a century."

Sustainable Mangrove Management -
http://www.fao.org/forestry/docrep/wfcxi/PUBLI/V6/T386E/1-10.HTM#TOP

1. Mangrove management should be a component of the total coastal zone management of the country.

2. Mangrove management planning should be a consultative effort between government, non-governmental agencies, resource users, mangrove dwellers and the scientific community.

3. Public awareness should be raised regarding the value of mangroves with special emphasis on their linkage effects.

4. An information database needs to be improved with systematic investigations under national and international sponsorships.

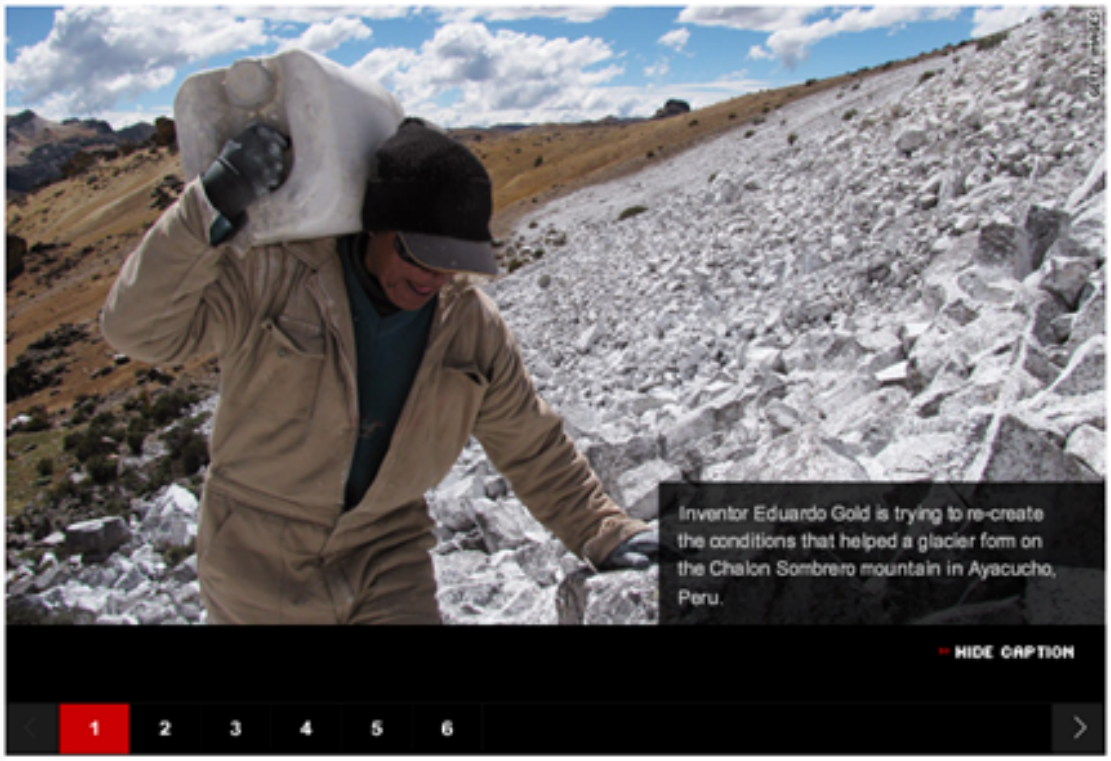
5. Political commitments towards the sustainable management of mangrove ecosystems will be required at the national levels.

6. Cooperation among international mangrove institutions should be enhanced to exchange ideas and experience in the field of the mangrove ecosystem and its management.

Can painting mountains restore a glacier?

By **Matthew Knight**, for CNN

July 7, 2010 -- Updated 0533 GMT (1333 HKT)



STORY HIGHLIGHTS

- Peruvian inventor Eduardo Gold is whitewashing an extinct glacier
- Gold hopes that by cooling the rock surface he can bring it back to life

(CNN) -- High up in the Peruvian Andes an experiment has begun to revitalize an extinct glacier.

The Chalon Sombrero glacier dried up many years ago, but Eduardo Gold thinks he can create the conditions that will allow ice to form once again.

Armed with a boiler suits, some white paint and a few llamas to carry equipment, Gold and a team of four helpers make the daily trek up to nearly 5,000 meters above sea-level to paint rocks on a mountainside.

So far Gold and his team have covered three hectares. Their aim is to paint three peaks in the Andean region of Ayacucho in southern Peru totaling 70 hectares (around 170 acres).

Gold, who lives in Licapa, a town at the foot of the mountain, founded Glaciares Peru in 2008, and in 2009 the project was selected as one of 26 winners of the World Bank's "100 Ideas to Save the Planet" competition.

So far, Gold has been relying on private donations and his own resources, but soon he will receive the first of two $100,000 payments from the World Bank to fund his work whitewashing the rocks.

The project might appear a little absurd, but it has a solid scientific principle behind it. It's called the albedo effect.

By painting dark rocks white, less of the sun's energy is absorbed by the rocks and more is reflected away from the Earth, lowering the temperature of the rocks' surface.

Otto Gold, from Glaciares Peru told CNN: "We are hoping to lower the temperature on the surface of the rocks from 20 degrees Celsius to five."

If they are successful Glaciares Peru will revitalize the water supply to an impoverished area of the Andes.

"Also, at the same time we are creating jobs and we can create thousands of jobs if we are successful," Gold said.

He says that local people have given the project a good reception, but there are some that remain skeptical.

"I understand that," Gold said. "But I would say to them that this deserves a chance to prove that it is right or wrong. And it's no harm at all."

Andy Ridgwell from the School of Geographical Sciences at the UK's University of Bristol says that it will take several years to find out whether the experiment will achieve anything significant.

"If it's at all feasible, then it is an interesting thing to try. If you can get some glacier mass re-established then you can have that water supply buffering that glaciers provide," Ridgwell told CNN.

The albedo effect may have helped cool the area around the city of Almeria, in southern Spain.

The expansion of greenhouse farming in the area, which started in the 1970s, has grown to cover nearly 30,000 hectares of land around the city. And in the summer the roofs of the greenhouses are whitewashed, so that plants inside don't overheat.

In 2008, Pablo Campra, from the University of Almeria, reporting in the Journal of Geophysical Research, found that that the Almeria region had experienced a drop in temperature by an average of 0.3 degrees Celsius from 1983 to 2006.

This was compared to an average temperature rise of around 0.5 degrees Celsius throughout the rest of Spain during the same time.

Campra concluded that the temperature fall may have occurred because of the growth of greenhouse horticulture in the region.

It's this downward temperature trend that Glaciares Peru hope to replicate. If they can achieve their objectives they hope to implement a "cool credits program" -- similar to carbon credits -- which they say will create a sustainable source of revenue and enable the replication of similar projects in other parts of the world.

While Peru's environment minister Antonio Brack is less than enthusiastic, calling the project "nonsense" last year, Jonathan Bamber, director of Bristol University's Glaciology Center, says Eduardo Gold's idea of painting rocks white isn't preposterous, but they'll have to paint a lot of them.

"Whether it will have the desired effect or its closing the stable door after the horse has bolted remains to be seen," Bamber told CNN.

"If you can reduce the overall energy balance of the region you might have a chance of reducing the amount of melting that takes place," Bamber added.

Eduardo Gold aims to complete the project in two years time, by which time he hopes to have proved the doubters wrong.

Why are Glaciers Melting Faster Today -
http://www.buzzle.com/articles/why-are-glaciers-melting.html

The prime reason for this is sudden and rapid industrialization which in turn has caused global warming - the prime culprit of fast melting glaciers.
The indiscriminate burning of fossil fuels has resulted in extreme atmospheric pollution leading to this condition. Pollutants help in trapping more heat in the earth's atmosphere, increasing global temperatures.
It is due to this increase in temperature that glaciers are melting more than they actually should. When a glacier melts fully, it exposes the earth below. Glaciers absorb approximately 20% heat from the sun, reflecting back 80%. When the earth gets exposed this percentage gets reversed. This in turn causes a further increase in temperature.