

Two Decades in the Rainforest:

THE PHOTOGRAPHS AND STORIES
OF TEACHERS WHO HAVE TRAVELED
TO THE TROPICS FROM 1990-2009



Edited by Bruce Calhoun, President of Save the Rainforest, Inc.

Two Decades in the Rainforest:

THE PHOTOGRAPHS AND STORIES
OF TEACHERS WHO HAVE TRAVELED
TO THE TROPICS FROM 1990-2009

Edited by Bruce Calhoun, President of Save the Rainforest, Inc.



Copyright 2009, Save the Rainforest, Inc. www.saverfn.org
A nonprofit organization.

Cover Photo: Owl butterfly by Dan Patrick

Forward

In the late 1980s young people from all over the world became concerned about deforestation in the tropics, and joined grass roots organizations that raised millions of dollars to create private rainforest reserves. One of the organizations they joined was Save the Rainforest, Inc. (STR), founded by teachers and students at Dodgeville High School in Wisconsin. It wasn't long before STR realized that there were a lot of teachers and students who wanted to visit the rainforests they were helping to save. As a result, STR set up three courses in the summer of 1990 to Monteverde, Costa Rica. The courses were a big hit, and within a few years 25-30 courses a year were being scheduled by STR to Costa Rica, Belize, Ecuador and Panama.

The students and teachers who went on those courses were hosted by Latin American conservation groups. These groups, such as Programme for Belize and Panama's National Association for the Conservation of Nature, did an extraordinary job introducing course participants to the tropical ecosystems and cultures of their respective countries. They also took great care to make sure participants were comfortable by building rainforest education centers and training staff to care for their North American guests. The teachers,

especially, appreciated this, and many have showed their appreciation by returning with their students to Belize, Costa Rica, Panama and/or Ecuador time and time again. This has helped the conservation groups by allowing them to generate funds for ongoing management and protection of rainforest reserves. It has also benefited the locals, who have worked as guides, cooks, and drivers, or sold handicrafts to course participants.

The students who have taken the courses have benefited, too. The courses have opened their eyes, not only to the rainforest, but to cultures much different than their own. Anna, who took a course to Belize in 1991, sent an email to STR saying, "To be completely honest, it changed my world in a way that I can't fully describe in words." Kim, in reference to her visit to an Embera village, stated in an essay she composed, "Watching the men in yellow loin cloths walk past me, the women wearing nothing but straw skirts, and the children painted all over their bodies, it was all overwhelming. It is so different than the way we live here in America, and I realized how much I take for granted." Michael, who took a course in Panama recently, wrote a note to his teacher, "This journey has had a profound influence on my view of the world. This



Photo by Butch Beedle



Photo by Butch Beedle

voyage has taught me many things such as generosity, kindness and social skills, and has helped me mature as a person." Some students have been influenced to such an extent that they have pursued careers in tropical conservation and/or education. One young woman earned a PhD in tropical forestry and is currently working for the Environmental Defense Fund in Washington, D.C. Another student earned a PhD in botany and is a professor in a university in New Zealand. Yet another student became a biology teacher, and is now taking her own students on STR courses.

Other stories of note include Mary Ann Gregory's and Steve Daily's. On the second day of a course in Ecuador in 1997 Mary Ann fell and broke her leg. After getting a temporary cast put on her leg, a volunteer at Jatun Sacha station suggested that Mary Ann spend some time in a tree house observatory. Mary Ann liked the idea, and with the help of several people she was carried into the forest, hoisted up to the tree house with mountain climbing gear, and deposited in the tree house. Mary Ann spent three marvelous days and nights in the tree house, becoming intimate with the wildlife of the forest canopy---a unique experience. Steve's story took place in Belize. During a trip there in the early 90s he became acquainted with a Belizean student who had joined Steve's group as part of a scholarship program. Steve decided to sponsor the college education of that student. Years later, on a subsequent trip to Belize, Steve found that the student was

managing Programme For Belize's rainforest education center at La Milpa.

In total, over 8,000 students and teachers have taken STR courses. Not all of the students have gone on to careers in conservation or education. Not all of the teachers have broken their legs or provided a college education for a bright young Belizean. But all of the teachers and students have played a role in making the protection of tropical forests a popular cause, and many have raised awareness about the plight of rainforests by giving lectures in their communities and/or writing articles about their rainforest trip in local newspapers. They have also helped to pave the way for ecotourism in the rainforest. A number of travel agencies now market themselves as providers of rainforest trips, not only for students, but for nature loving adults as well. Some of them have won ecotourism awards because they have operated in a sustainable manner and have designated a portion of their profits to support conservation and local peoples. This yearbook, however, does not include their stories. Every story in Part II of this yearbook, every photograph, was written or taken by teachers and students who have participated in a STR trip sometime between 1990 and 2009..

Bruce Calhoun
President
Save the Rainforest, Inc.

TABLE OF Contents

PART I. MOST POPULAR DESTINATIONS

Belize	2
Costa Rica	6
Panama	10
Ecuador and the Galapagos	14

PART II. TEACHER CHAPTERS

John Menke. St. Gregory Prep. Tuscon, AZ	18
Dan Hoffman. River Falls High School. River Falls, WI	24
Amy Lacks. Drew School. San Francisco, CA	26
Carole Kamrar. Modesto High School. Modesto, CA	28
Joel Davis. Columbus Academy. Gahanna, OH	30
Marni Landry. Paradise Valley High School. Phoenix, AZ	32
Dan Patrick. Wichita Falls High School. Wichita Falls, TX	34
Mary Ann Gregory. Dysart-Genesco Elementary. Dysart, IA	40
Mike Freidlin. Abington Heights Middle School. Clarks Summit, PA	42
Steve Daily. Ivy Tech. Kokomo, IN	46
Cliff Lerner. Keene High School. Keene, NH	48
Maggie Eisenberger. Chesterfield Day School. Chesterfield, MO	52
Butch Beedle. J.C. McKenna Middle School. Evansville, WI	54
Debra Weitzel. Middleton High School. Middleton, WI	64
Roy Triveline. Warren Township High School. Gurnee, IL	66
Barb Makovec. Bigfoot High School. Walworth, WI	68
Debra Duffy. Cape Henry Collegiate School. Virginia Beach, VA	69
Kathy Warpinski. Dodgeville High School. Dodgeville, WI	70
Mary Steinbeck and Daina Powers. Sioux Central & Hartley-Melvin-Sanborn High Schools. Hartley, IA	74

PART III. TROPICAL FORESTS, THEIR DECLINE, AND HOPE FOR THE FUTURE

Tropical Forests	77
Their Decline	79
Hope for the Future	85



Most Popular Destinations

Belize

Once known as British Honduras, Belize is a country culturally distinct and biologically rich. Because of its low population density and conservation-minded government, much of Belize is still forested, and Programme For Belize (PFB) manages and protects much of that forest. The forest PFB manages and protects is contained within the 260,000 acre Rio Bravo Conservation and Management Area. This is where PFB hosts STR groups during the rainforest segment of the Belize course.



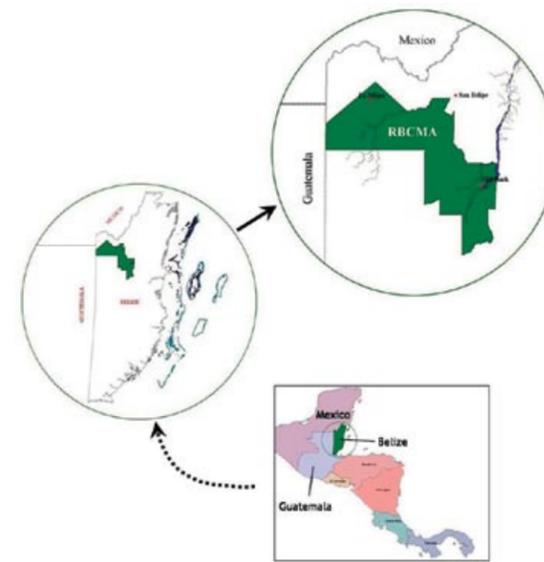
La Milpa trail map. Photo by Herbert Haylock

There are two field stations within Rio Bravo; La Milpa and Hill Bank. Groups are usually based at the charming and comfortable La Milpa field station, which is surrounded by primary forest and located only three miles from an unexcavated Mayan city that is a major archaeological site. Course participants visit this site and learn about the research that is taking place there. Participants also hike the many forest trails, learn about the ecology of the forest and are tutored on sustainable development, community outreach programs and conservation strategies. In addition, they make excursions to a

Mennonite Community and a Maya Mestizo village for enriching cultural activities.

During the second half of the course participants snorkel the second largest barrier reef in the world. In the early years of the STR groups stayed on Water Caye. More recently groups have stayed in facilities on either St. George's or Spanish Lookout Caye. After water safety checks and lessons for beginners, groups explore Belize's Great Barrier Reef. One snorkeling site is within the Hol Chan Marine Reserve. Snorkeling here gives students and teachers a chance to see

unspoiled coral reefs where the protected fish are large and curious. Snorkeling on the shallow patch and back reefs of Seagent Caye is exciting, too, though not as exciting as snorkeling Shark Ray Alley. Swimming with Sea Manatees of Gallows Point is perhaps the most unforgettable experience participants have during the marine biology segment of this course. Ecosystems that are studied during this part of the course include coral reefs, grass beds and mangrove estuaries.



Grouper. Photo by Cliff Lerner



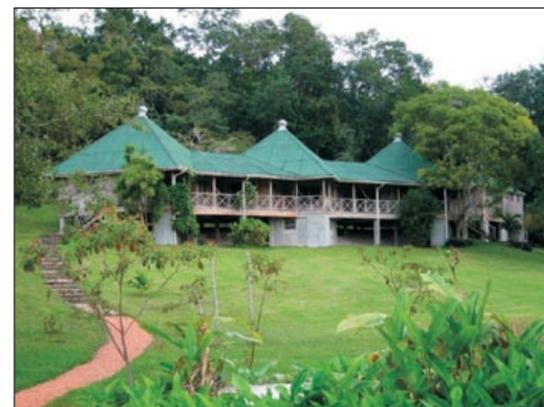
Discover scuba class. Photo by Cliff Lerner



Tree frog. Photo by Dan Patrick



Leaf cutter ants. Photo by Elon College



La Milpa dorm. Photo by Herbert Haylock



Diver on wall. Photo by Cliff Lerner



Harpy. Photo by Ryan Phillips



Night spotting at La Milpa. Photo by Elon College



Photo by Cliff Lerner



Photo by Cliff Lerner



Ringed Kingfisher. Photo by Dan Patrick



Reef team. Photo by Cliff Lerner



Emily on reef. Photo by Cliff Lerner

Costa Rica

STR courses in Costa Rica are hosted by Fundacion Neotropica at their rainforest education center on the Osa Peninsula. The center was built with funds donated by Danish school children. It features comfortable cottages with a bathroom and screened in porch, a very nice dining area and research/library facilities. Fifteen minutes away is Dulce Gulf, where dolphins can be encountered and humpback whales can be seen in season. Corcovado National Park and its 375 species of birds, 124 mammal species, 48 amphibian species and 71 species is nearby, also. Magnificent macaws are common. Toucans, tree frogs, jaguars, iguanas, sloths and anteaters are all to be found, too. In addition there are many species of monkeys to be observed in the park as well as around the center. The rare and agile squirrel monkey is a particularly enjoyable animal to observe.



Neotropica offers courses that give participants a chance to see and learn about Costa Rica's wildlife and the ecosystems they depend upon. Neotropica has also woven into its program a rich cultural component. In addition to studying mangrove estuaries and primary forests, course participants visit the indigenous Guaymi indian reserve, organic farms and the sustainable development projects of the Gamba community. Local school visits are also very popular, as is time spent helping with reforestation projects or beach clean ups. Additional activities often include Spanish language tips sessions, dance lessons, a community soccer game and workshops with local artisans.

Kayaking, nightwalks, a hike to a local waterfall, a day spent in Corcovada National Park and exploration of the Chocuaco lagoon are some of the other course highlights. The second to last night of the course is spent at an award winning ecolodge on the Pacific ocean. The lodge is located on a promontory, and there is a path that leads down to a secluded and beautiful beach. The last night is spent in San Jose, where a farewell dinner is held before groups return home the next day.



Cabanas at Fundacion Neotropica's education center. Photo courtesy of Fundacion Neotropica

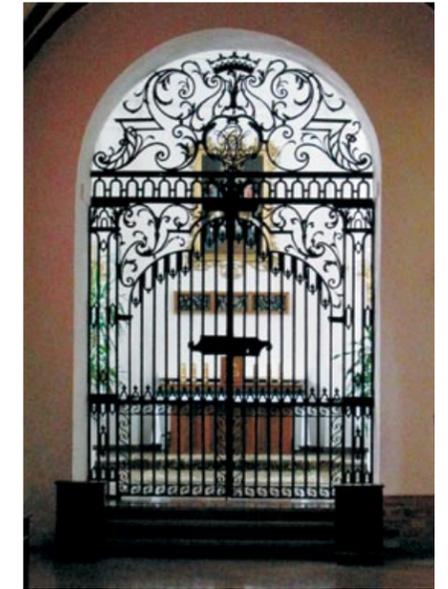


Photo by Kathy Warpinski



Market place. Photo courtesy of Fundacion Neotropica



Flowering heliconia. Photo courtesy of Fundacion Neotropica



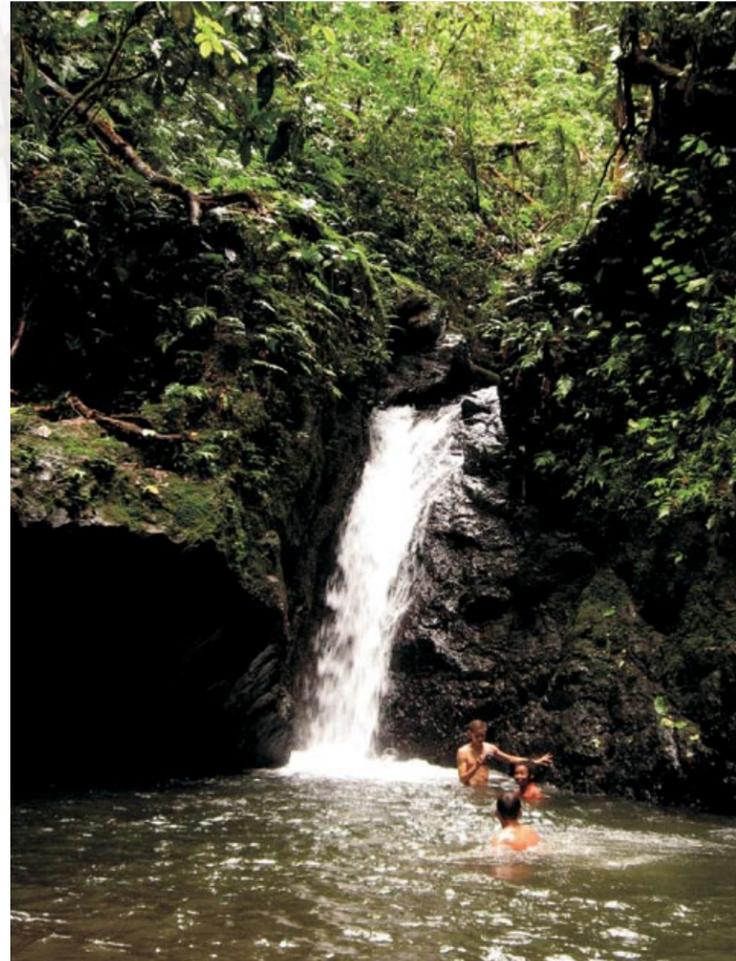
Oxen used for plowing and pulling carts in rainforest. Photo by Bill Boyer



Typical house in rainforest. Photo by Bill Boyer



Bottle nose dolphin photographed from kayak. Photo courtesy of Fundacion Neotropica



Students swimming at base of waterfall. Photo courtesy of Fundacion Neotropica



Coopers Hawk. Photo courtesy of Fundacion Neotropica

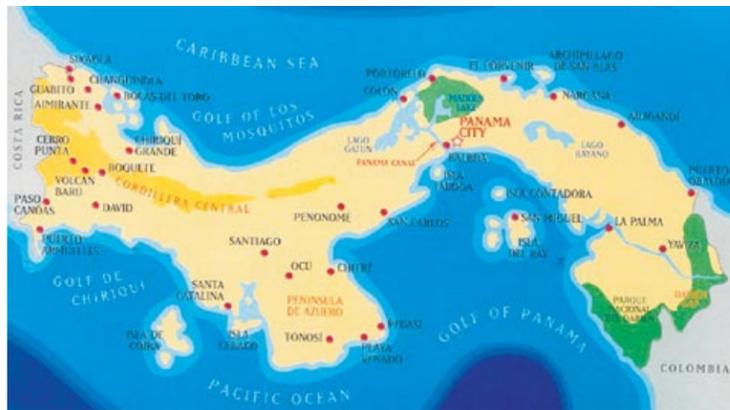
Panama

ANCON Expeditions, under the umbrella of the National Association for the Conservation of Nature, hosts STR courses in Panama. Known as the Crossroads of the Americas, the Panama Isthmus emerged from the ocean floor three million years ago. Since that time numerous plant and animal species have been able to migrate from one continental mass to another. Many of these species have also congregated to form a unique biodiversity in Panama. ANCON is passionate about protecting this biodiversity, and educating North Americans about the rich natural heritage of their country. As a consequence, it manages several education centers in Panama where STR groups can stay.

Students and teachers who participate in the standard Panama course are hosted in a Panama Canal zone station for the first half of their course, and the Bocas del Toro station for the second half of the course. While in the Panama Canal zone participants learn about tropical wet forest and how the forests in the area serve as a watershed that supplies the billions of gallons of water needed to operate the Panama Canal. They also learn about the colorful history of Panama, touring colonial towns and visiting the ruins of old forts. Even more interesting, is the overnight stay in an Embera village, where participants have a chance to interact with indigenous people in a non-tourist setting.

For the second half of their course, participants fly to the island of Bocas del Toro, just off the northern (or Atlantic) coast of Panama. Every day, while there, they depart by boat from the waterfront station. Some days students and teachers explore mangrove estuaries and snorkel on coral reefs. Other days they visit scenic turtle nesting beaches and take on such service projects as painting a local schoolhouse and planting trees.

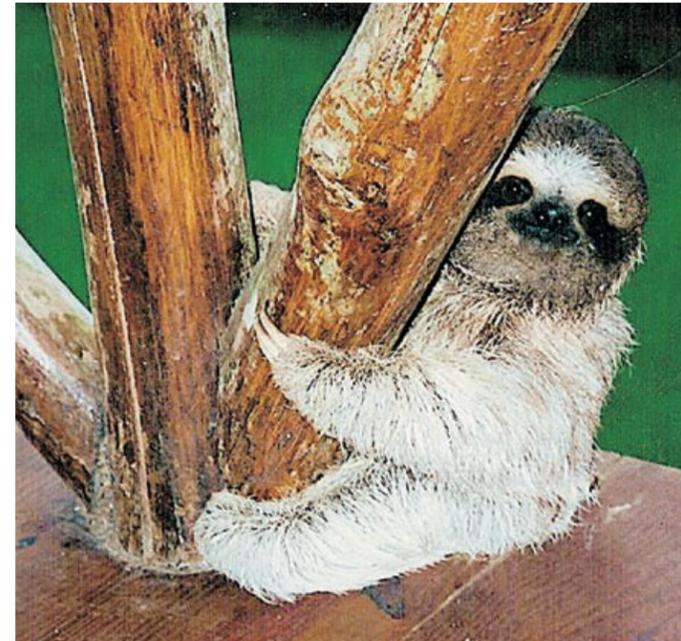
Teachers who wish to take their students on more adventurous trips in Panama go to Cana station (in Darien National Park) or Punta Patino station (on the Pacific coast). Darien National Park protects a two million acre stretch of forest that acts as a buffer between Panama and Columbia. It's wildlife is plentiful and magnificent, and it is home to a healthy breeding population of the world's largest eagle, the rare Harpy Eagle. The only way to get to the Cana station is by chartered plane. Punta Patino can be reached by chartered plane or chartered boat. To the front of the station is the Pacific ocean and extensive tidal flats. To the rear of the station impressive stands of highly endangered tropical dry forest exist. Students and teachers who visit these two sites find themselves really off the beaten track.



Poison Dart frog. Photo by Butch Beedle



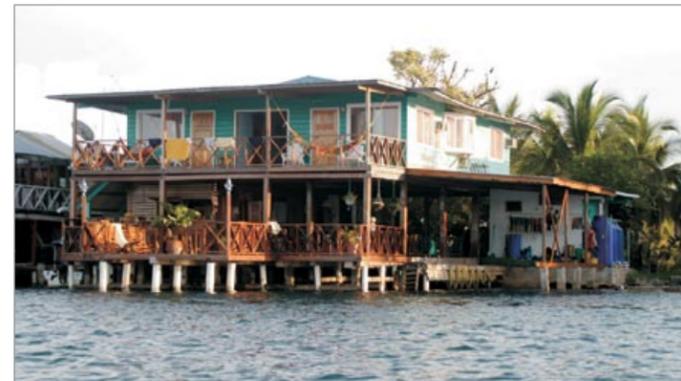
Miraflores Locks. Photo by Butch Beedle



Three toed sloth on Rio Chagres Center deck (2003). Photo by John Menke



Embera demonstrating traditional dance. Photo by Cliff Lerner



Bocas del Toro waterfront field station. Photo by Cliff Lerner



Queen Angelfish, Bocas del Toro. Photo by Christian Gerez



Panama 2003: Leaving Embera Drua village in the rain. Photo by John Menke



Sunset over the Pacific at Punta Patino. Photo by Cliff Lerner



Portobelo. Photo by Butch Beedle



Swimming Embera. Photo by Butch Beedle



Photo by Butch Beedle



Night monkeys. Photo by Butch Beedle



Toucan. Photo by Butch Beedle



Photo by Butch Beedle



Snorkeling. Photo by Butch Beedle



Bocas del Toro. Photo by Cliff Lerner

Ecuador and the Galapagos

Quito, Ecuador is the jumping off point for courses in Ecuador and/or the Galapagos. Some groups do the all-Galapagos course, and fly to San Cristobal Island the morning after they arrive from the United States. While on San Cristobal they stay at a field station in the highlands where researchers and volunteers live. Accommodations are somewhat rustic, but course participants get a real feel for the Galapagos that they can not get on an ecotour boat. Sea Lion Beach is one of the first places participants visit. Marine iguanas and sea lions are plentiful, as is bird life. Students and teachers also hike to a volcanic crater lake (the largest body of fresh water in the Galapagos), learn about giant tortoises at a Galapagos National Tortoise Research Site, and snorkel offshore in Tigertas Cove, beneath dramatic cliffs. They also embark by charter boat for a day of exploring the coastline of San Cristobal and snorkeling with sea lions. While snorkeling with the sea lions they often encounter sea turtles, large schools of fish and the occasional Galapagos shark.

Some groups that go to San Cristobal add on visits to Isabella Island and Baltra. Isabella is the largest island in the Galapagos. While there, participants tour extensive

lava formations, snorkel (sometimes with the Galapagos penguin) and travel by horseback up the slopes of high elevation volcanos and down into their craters. Uniques subspecies of giant tortoise live there. On Baltra participants travel to sites of interest by bus. The main stop is at the Darwin Station, where they learn about the human and natural history of the Galapagos.

Many groups spend a week on the mainland of Ecuador before they visit the Galapagos. These groups usually travel to the Jatun Sacha field station in the Amazon (8 hours from Quito by bus) or La Hesperia station. La Hesperia is located in a cloud forest about 2.5 hours from Quito. In the Amazon, one of the highlights is overnighing in a Quichua village like Rio Blanco. In La Hesperia, in addition to learning about the rainforest, participants overnigh in a native Chilhuilpe community. Sustainable agroforestry and community outreach is a theme at both stations, and participants are introduced to the harvesting and processing of coffee and cacao (chocolate). In the past Fundacion Jatun Sacha hosted STR groups. More recently, Finding Species has taken over the responsibility, under the direction of Fundacion Jatun Sacha's former course coordinator.



Guide with map of Floreana. Photo by Joel Davis



Students observing some of the 500 plus species of birds in the Jatun Sacha Reserve. Photo by Bruce Calhoun



These several hundred high "vertiente" waterfalls took our breath away. Photo by Kathy Warpinski



Sign at reserve acknowledging donations



Blue star fish. Photo by Amy Lacks



San Cristobal field station. Photo by Amy Lacks



Reforestation on San Cristobal. Photo by Joel Davis



Photo by Carole Kamrar

Teacher Chapters

St. Gregory College Prep

TUCSON, AZ



Panama 2003: Class ready to head out on a trail



Panama 2003: Swimming in the Rio Chagres, at the Embera Drua village

By John Menke, Biology Teacher

Field trips have always been central to my Tropical and Marine Ecology course; without the field trips, I would probably have had to pay students to take my course. After three decades of planning and carrying out field trips on our own, usually to the Gulf of California or St. Croix, in the Caribbean, I switched to the Save the Rainforest, Inc. trips (Panama 2000 and 2003, Belize 2001, and Ecuador 2005, always during July; I retired in 2006). The STR field trips have been an ideal complement to the coursework carried out on and near the St. Gregory College Prep campus in Tucson.



Belize 2001: Student with grasshopper, on the Mahogany trail, at the La Milpa field station

Before they headed out for the two weeks in the field, the students read extensively, and had about 25 hours of classroom learning. By the time they arrived at Rio Chagres, or La Milpa, or La Hesperia, they essentially understood not only the basic structure of neotropical forests and marine communities, but also their basic function. The more an individual knows, the more that person tends to observe and understand when in the field. The cultural exchanges were a delight to each group of students; they tended to prefer ecosystems that included people, such as the Embera or Tsachila. I have also

noted over the past three decades, that the more exotic and adventurous an environment is to the students, the more focused their learning. The mind is invigorated by what it has not previously experienced. In this sense, the STR field trips really excited the minds of my students.

The local guides on each field trip were excellent – they knew their forests, ruins, cultures, mangroves, reefs, etc. very well. Their knowledge helped each student to better see the connection between the ideas presented in the classroom, and in the scientific papers they had read, and what they observed in the field.

Many of my students who traveled to Panama, Belize, or Ecuador, are now involved in field work, from dissertation research on patterns of coral bleaching in the Caribbean, to ethnobotanical research on Isla Tiburon and other islands in the Gulf of California.



San Cristobal, Ecuador 2005: Marine iguana and lava heron



Belize 2001 group, flaunting their tans on Southwater Cay



Panama 2003: Students combining field notes and literature, on the deck of the Rio Chagres Center



Ecuador 2005: Student in traditional "fig leaf" and boots at the Hesperia field station



Ecuador 2005: Student getting the annatto seed treatment at the Chillhuilpe village beauty salon



Hemipteran in cloud forest at La Hesperia (2005)



Pair of swallow-tailed gulls downhill from the Jatun Sacha field station on San Cristobal island (2005)



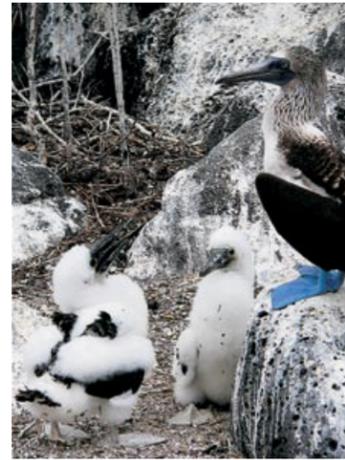
Arriving at the Rio Chagres Center, 2003



Ecuador 2005: Palms and guarumo in mist near Chilhuilpe village



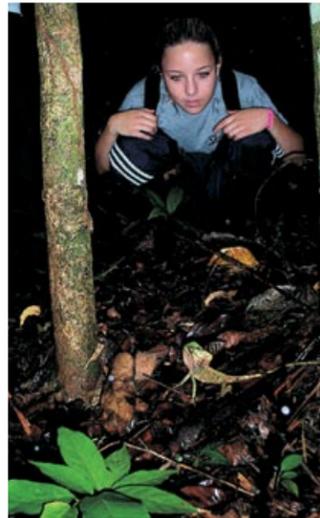
The meeting of two families: Panama 2000 class with Embera on the banks of Rio Chagres



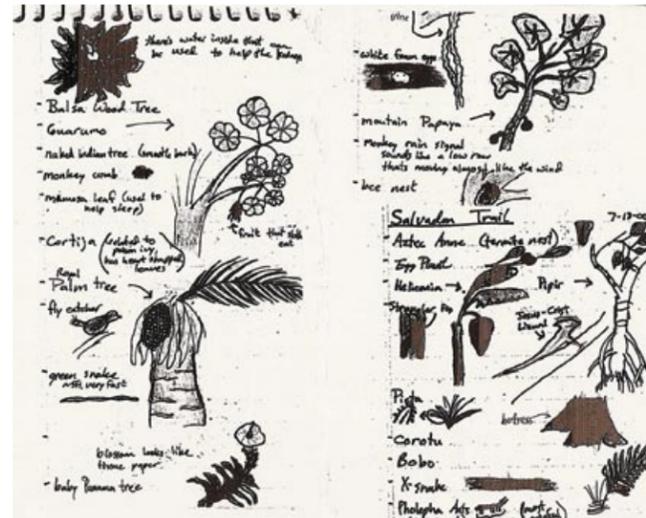
San Cristobal Island, Ecuador 2005: Blue footed booby with its young



Panama 2003: Student with poison arrow frog on Isla Colon, Bocas del Toro



Panama 2003: Student observing lizard in Soberania Nat. Park



One page of student field notes taken during a hike in Soberania Nat. Park, by the Rio Chagres Center, Panama 2000



Panama 2003 class ready to reboard two mondo-cayucos on the Rio Chagres, after swimming in a tributary



Belize 2001: Student talking about music with Maya mestizo village children in northern Belize



San Cristobal Island, Galapagos 2005: Mockingbird



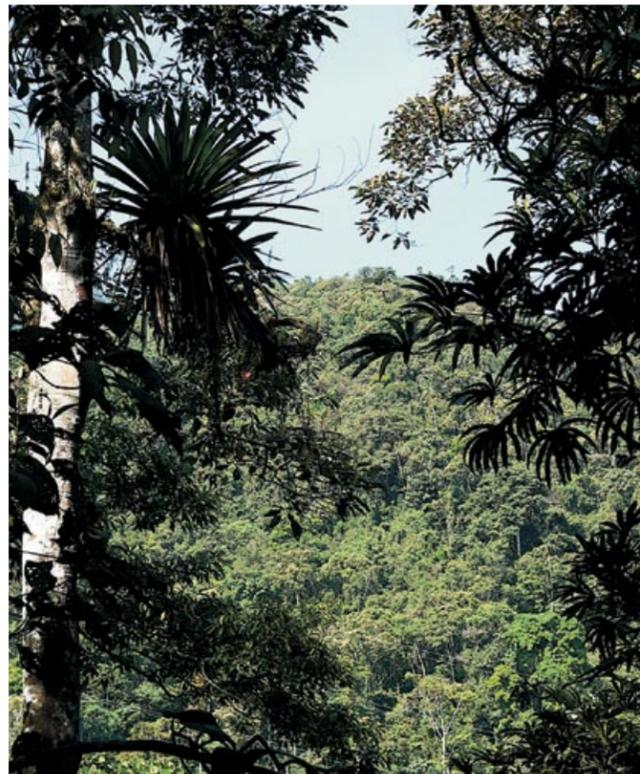
Ecuador 2005: Students entering La Loberia, just after arriving at Isla San Cristobal, Galapagos



Panama 2003: Food and conversation at Bocas Inn, Bocas del Toro



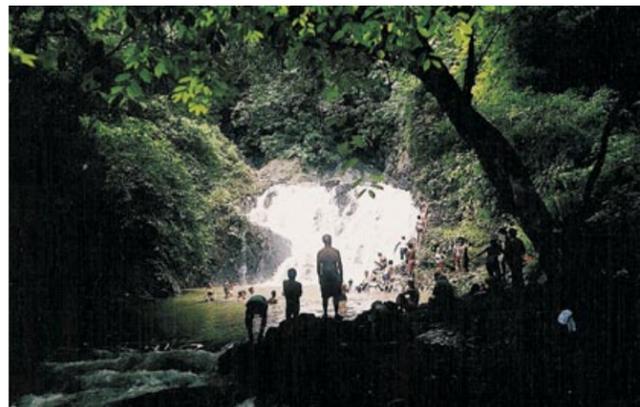
Ecuador 2005: Dr. Menke confuses a San Cristobal cactus forest for its counterpart in Saguaro National Park, in Tucson, Arizona



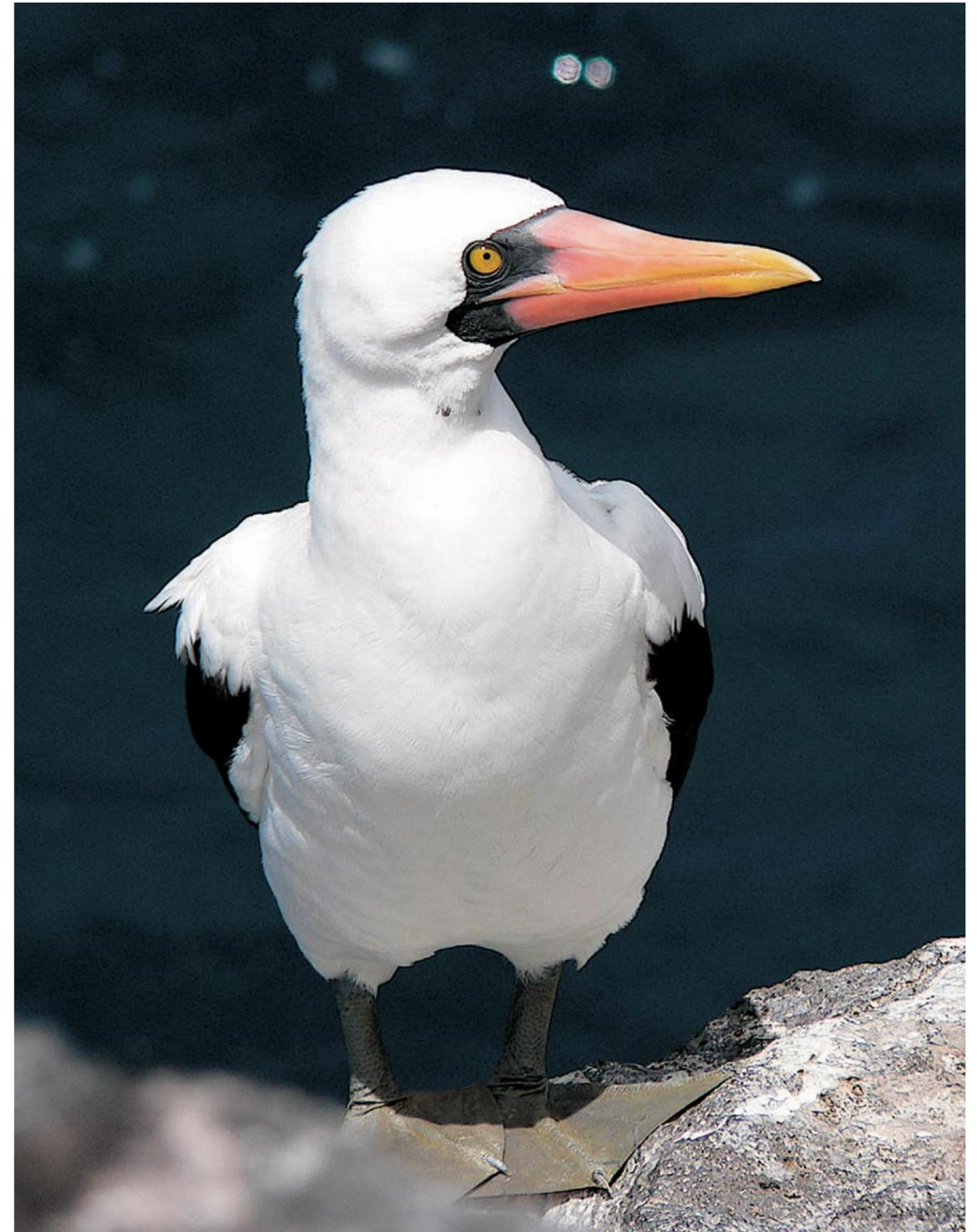
Ecuador 2005: Two sides of a cloud forest valley near La Hesperia



San Cristobal, Ecuador 2005: Tortoise



The entire Panama 2000 class decides to do some water sampling on a tributary of the Rio Chagres



San Cristobal, Ecuador 2005: Nazca or Masked booby

River Falls High School

RIVER FALLS, WI



Entire group in secondary rainforest with our guides

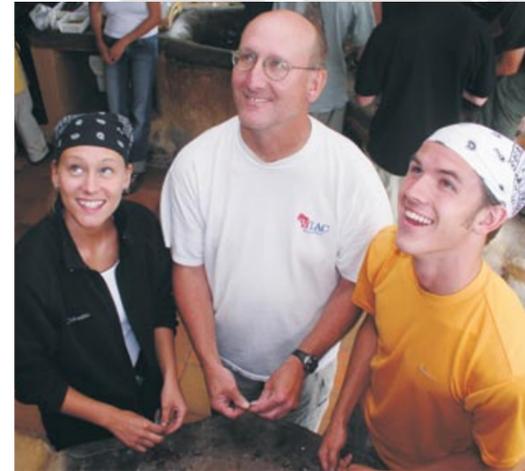
By Dan Hoffman, Biology Teacher

I took 10 River Falls High School students to Ecuador in 2006. We stayed at La Hesperia Biological Station for five days in the cloud forest in the Andes. The facility was great, people were great, and the food was excellent. At this facility, we saw how the coffee bean was dried, roasted and made into coffee along with how cacao beans are made into chocolate. We observed the secondary and primary rainforest in the area as well. From here we were driven to an indigenous community to interact with and stay with the Chilhuilpe Indians. Here we learned about their customs, dress, agriculture, and daily lives.

After our short stay here we spent a night in the capital Quito. Here the kids got a chance to get their clothes washed and interact with the people within the city. They also visited the local market for souvenirs.



Galapagos tortoises at the Galapagos National Park



Myself (Dan Hoffman) and my daughter Carly Hoffman, and student James Malaney husking roasted coffee beans



Baby sea lion suckling on the beach

Then it was on to the Galapagos. We landed on Baltra Island. Here we boarded an island taxi and we were taken to another nearby island known as Santa Cruz where we were driven across the island to the marina. Here we boarded a boat and spent over 5 hours at sea until we got to San Cristobal. We stayed at the newly completed Jatun Sacha facility on the southwest end of the island. Here we participated in snorkeling, birdwatching, sight seeing, a visit to the Tortoise Research facility, and hiking through the volcanic landscape of the island. We learned how the Europeans brought various plants and animals to the islands that are now causing many problems for the natural ecosystem. We also observed marine iguanas, sea lions, many species of fish, blue-footed boobies, frigate birds, Darwin's finches, sea turtles and the large land tortoises.

Our trip ended with our last night in Quito where the students got a chance to get reacquainted to city life that they were accustomed to.



A view of the cloud forest at La Hesperia

Drew School

SAN FRANCISCO, CA



White sand beach

By Amy Lacks, Biology Teacher

Taking my high school students to the Galapagos Islands in 2007 was truly a highlight of my teaching career. After teaching Biology for ten years, visiting the Galapagos Islands had always been a dream of mine. Being able to see what I had been teaching about right in front of me, and being able to share it with students, was an experience I will never forget.

I teach a unit on the evolution of Galapagos organisms in my Biology class, and so I was thrilled to see up close so many of the animals and plants that I teach about. We were able to observe firsthand the adaptations that have allowed the Marine Iguana to become so adept at feeding in the ocean. We saw many different subspecies of the Galapagos Tortoise, and were able



Blue Footed Booby

to differentiate them by island. The tree-like species of the prickly pear cactus were impressive to see, as well as the diverse Galapagos Finches. To top it all off, we snorkeled with sharks, observed Blue-footed Boobies in their nests, watched a penguin swimming underwater, and observed flightless cormorants diving for food.

While staying at the Jatun Sacha field station on San Cristobal Island, we were able to give back to the community by planting native plants and removing weeds. My students enjoyed getting sweaty and muddy while planting seedlings at the station, and felt proud that we were able to play a small part in their important efforts to restore the native communities on the island.



Rocky shoreline, San Cristobal Island



Parrotfish



Galapagos tortoises on San Cristobal



Marine iguana



Seastar



Sea lion



Green sea urchins



Frigate birds



Lava Arch, Isabella Island



White tipped shark

Favorite Experiences



Straddling the equator

By Carole Kamrar, Biology Teacher

My husband David and I went to the Jatun Sacha Biological Station in Ecuador with a group of high school girls and junior high boys in June of 1997. Every day and every night held something new. Here are a few of our favorite experiences.

July 2. We arrived at Amazonica in mid afternoon. It is an animal rehab shelter on the banks of the Rio Napo in the middle of nowhere. We walked up the concrete steps to the buildings, cages and open pens---the main idea of the center is to eventually reintroduce animals back into the wild. Monkeys were everywhere. They swung from one branch to another and two of them ran up my leg and perched on my shoulders. They then got into a disagreement over which had the right to sit on my head. They wrestled for a few minutes and then jumped over to Andrew's outstretched arms. Later, we saw the ocelot that was prowling back and forth in its enclosure---topped with barb wire. Our guide told us they were careful to feed the ocelot on time because one day someone forgot to feed it and the ocelot went right over the fence. It

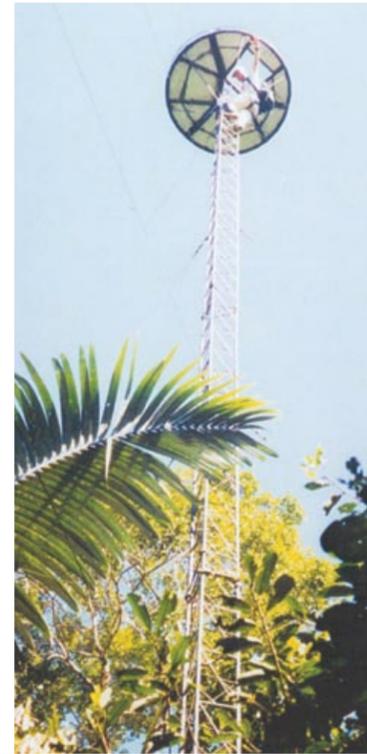


Rainforest lipstick

went to a neighbor's farm and helped itself to a chicken. The cat then carried the chicken back over the fence into the enclosure and had a nice fresh chicken dinner.

July 2. Evening. Don Gabriel talks about the history of Jatun Sacha. When he was a child he lived along the Anzu River. He was told not to cross it. Two hunters once crossed it and were speared by Huaorani, the warlike people whose territory started on the far side of the river. In 1952 Don Gabriel remembers how missionaries came to civilize the Huaorani. They flew over their territory broadcasting a message in English and Spanish. The Huaorani did not speak these languages. The missionaries then threw gifts out of the plane and landed near the river. The Huaorani speared them and destroyed the plane. Don Gabriel goes on to say the Huaorani were eventually civilized, and then talks about what it is like to be a shaman.

July 3: We hiked the short distance to Bird Hill. It was very humid and our clothes were wet and sweaty, but the day was beautiful. The volcano, Mt.



Jatun Sacha - Observation Tower, and Dave



Augustine, the Shaman of Rio Blanco. Healer of broken toes, bug bites, etc. An excellent teacher and guide.



Termite nest, dirt road, and bus

Sumaco, was showing across the valley. We took some panorama shots with our cameras. The river wound through the valley below and we could see the river town of Misahualli in the distance. Birds sang and flew overhead. Then we saw a bright red macaw flying. A cluster of five black birds with long tails were arguing in a tree and two hawks circled over our heads. The sun shone through their brown wings as they flew. Little finch birds were all around. There were many bird calls, all different. Cicadas suddenly began singing, all at once, all at the same time with a huge solid sound. Cicadas answered from another section of the hill and the forest below. Birds seemed to call back and forth from tree to tree across our ridge and the valley. David sat down and began to draw the beautiful scene. I began to write down my thoughts.

Other favorite experiences:

- ~walking in total darkness
- ~the sudden stopping of forest noises just before the rain
- ~the whoosh of heavy rain on the tree canopy
- ~washing your hair in a clear stream
- ~the booming sound of a howler monkey
- ~standing totally alone at the top of a skinny metal tower viewing the top of the forest canopy and hearing the sounds of bird songs and palm fronds moving in the wind
- ~swinging on a vine
- ~swimming in the Napo River
- ~sitting in a thatched hut at night listening to a Shaman tell the stories of traveling in the underworld
- ~watching as the same Shaman treats a broken toe with crushed leaves, fish oil and a diaper by the light of three candles
- ~watching as the first red macaw sighted in years at Jatun Sacha flies over
- ~relearning how to use your eyes to see even the smallest parts of nature



Rio Blanco Bridge - slippery when wet!



Dancing at "the lab" our last night at the Jatun Sacha Biological Station. Happy times!

Columbus Academy

GAHANNA, OHIO



Napping sea lion (San Cristobal)



Soccer with locals (San Cristobal)



Waterfall (San Cristobal)



Student with sea lions (San Cristobal)

Teacher napping with the sea lions (San Cristobal)

By Joel Davis, Biology Teacher

A fellow teacher and I traveled to the Galapagos Islands with 20 students from Columbus Academy in March 2008. We really enjoyed our trip even though there were some hardships. The black flies ("Carmelitas") were our constant companions while on San Cristobal. We got used to sharing bathroom space with very large spiders and cockroaches. We had some interesting food experiences-the popcorn in our soup was an interesting culinary delight at the Jatun Sacha field station. We really enjoyed snorkeling with seals, hiking over lava fields, playing soccer with the locals, learning how to Salsa dance, and seeing wonderful endemic wildlife such as iguanas, tortoises, and penguins. The guides were incredibly well educated and helpful. We learned a lot and stretched ourselves at the same time. I would do the trip again if I had the chance.



After snorkel with sharks off of San Cristobal



Students with organ pipe on Isabella on cooled lava



Student with map in dorm



Sally lightfoot on San Cristobal



Student by Wall of Tears (prison) on Isabella

Paradise Valley High School

PHOENIX, AZ



Students swimming at base of waterfall

By Marni Landry, Biology Teacher

The trips to Panama were life changing for both myself and for my students. From the time we are children we hear about how we should “save the rainforest”. Everyone agrees and repeats this mantra because it sounds like the right thing to do. But going and living in a rainforest is such a powerful experience that those words just disappear and are replaced with the overwhelming feeling that “I HAVE to do something to prevent the loss!” Spending time with the people who live in and off of the rainforest completely changed our ideas about why the forest is so valuable. These were humans just like us who will suffer greatly if these areas are not preserved.

Panama was the first international field trip I had taken with my students. Due to the professional, educational, and safe atmosphere that Save The Rainforest provided, I have felt confident enough to take students on trips all over the world. Our guides were knowledgeable, caring and personable. They were able to take what I had been teaching in my classroom and tie it to what we were experiencing in the forest and the coral reefs.



Marni admiring rainforest tree



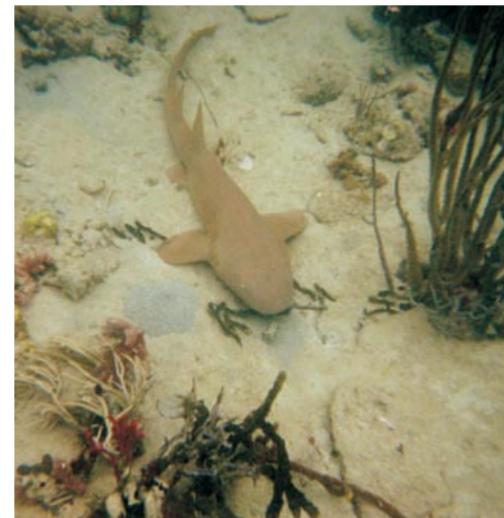
Young crocodile sunning himself



Hawksbill turtle, Bocas de Toro



Leatherback hatchling



Nurse shark, Bocas de Toro



Tree frog in Marni's room



Embera women making crafts



Three toed sloth in mangrove estuary

Wichita Falls High School

WICHITA FALLS, TX



Rufous-tailed Jacamar preying on dragonfly. Belize.

By Dan Patrick, Biology Teacher

(Editor's note. Dan participated in the very first Save The Rainforest, Inc. course in 1990 in Costa Rica).

Costa Rica, Belize, Honduras, Panama, Ecuador, and the Galapagos Islands – far away lands of mystery and wildness. Places I had always dreamed of and have now visited with my students through the rainforests courses of Save the Rainforest. During the past twenty years I have traveled to each of these countries and shared their unique learning opportunities with several hundred fortunate students. The trips have enriched my own knowledge and given me many valuable tales to share with the students in my classroom. I have been to Panama and Belize several times each and Ecuador twice and hope to visit each again in the future. Cana, the rainforest station located in Panama's Darien National Park, is my favorite place on Earth with its unbelievable avian diversity and remoteness. These trips are the highlights of my year and always a hit with the students who go. Following are excerpts from some of my journals and comments from some of the students who have gone on the trips:

Belize 2000

Hosted by Programme for Belize. First half of course was in the Rio Bravo Conservation Area: It is so peaceful here. It's

the best place we go for seeing toucans on a regular basis as they silently fly by the station clearing. One day we visited nearby communities. The Mennonite community has cleared forest right up to the Rio Bravo boundary. It is a depressingly impressive site. They just burned it about 6 weeks ago and are still using a big Cat dozer to push debris out of the way. You can see the Rio Bravo property sign at the edge of the clearing. Many of the students were impressed. Several said this was a great day and that they felt they learned a lot from seeing how the people here live happily with so little. Nora Whiteis talked about it some before dinner and Neomi Tio said she wrote 7 pages in her journal - mostly about thoughts. We also visited a school in San Lazaro and gave away school supplies. Our students really enjoyed the Belizean kids - many wanted to stay there much longer than we had time for.

On another day we did a solo activity along Mahogany Trail in the rainforest. Below are student comments:

peaceful, good to be out there alone;
saw Spider Monkeys;
quiet time with God;
enjoying peace, not quiet because of birds;
hear rain + birds but don't see them because of canopy;
saw black orchid – National Flower of Belize;

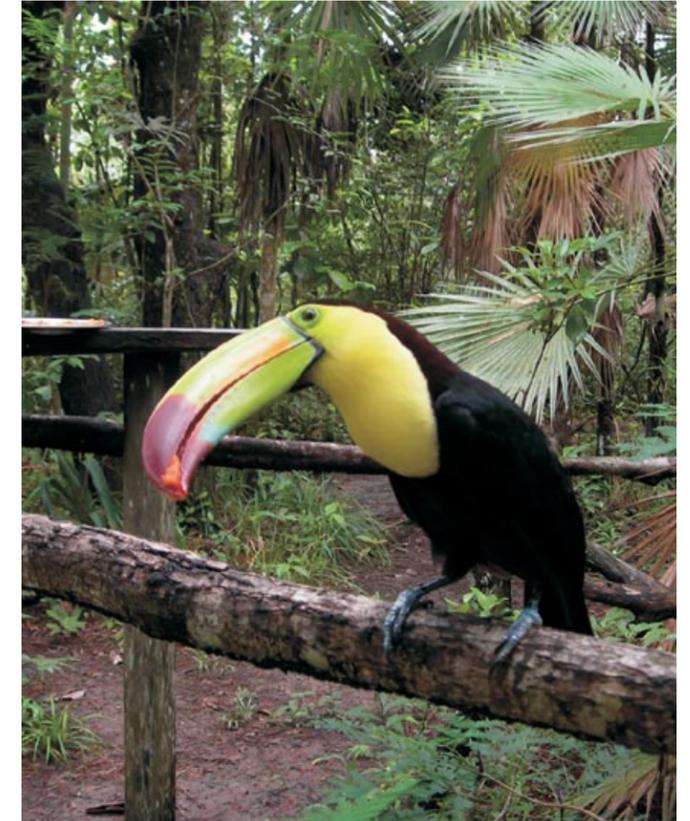
scary – paced back and forth;
clear mind to enjoy it;
forest has its own spirit – its alive; things fit together so nicely;
notice decomposition for nutrition of things;
everything seemed muffled;
powerful feeling;
saw a hummingbird;
it was nice, think for yourself;
cool to watch leafcutter ants;
seemed a long time/ seemed a short time;
panicking over being alone;
sounds like a symphony – rain background percussion;
overwhelmed by sounds;
colorful bird; talked to toad;
Anole lizard with dewlap;
how much this reminds us of our insignificance – we want to
take something with us;
what did first people here think? ;
turn with every little noise, got more relaxed;
heard a woodpecker;
noises you can't see the source of;
full cycle of life from decay to growth.

Second half of course was based out of South Water Caye, an island on the Great Barrier Reef of Belize: Snorkeled out to patch reef to south of island with Gary Cardinal, Nora, Nathan, Mel, Amanda. Really great – French and Queen Angelfish; 6' nurse shark swam right at us and then swam off to the left. This is the first shark I have ever seen – cool! Nora saw it first and practically crawled over Gary and I in fright. She later thought it was cool, but scary at the time.

From there most of group returned to Pelican University, while Les, Gary, Hillary, two guides and I went back over and snorkeled the mangroves again. Biology paradise over there with such a wide variety/range of species and even Phyla on every branch! Saw Bat Fish, Sea Horses, immature French Angel and many more. Encrusting sponges and bryozoans of every color, sea anemones, shrimp, crabs – you name it!

Student comments in my journal for Belize 2000:

June 9, 2000 Wow. I don't know where to start because there is a lot to say. This trip has really been a learning experience for me; about the rainforest as well as how to deal with people, and about life in general. I think my favorite things were the birds. I know I didn't come birding every morning, but I still love it! It is neat to be able to see animals where they live here, and to be able to go into their territory. The rainforest is a whole other world compared to how we live. When you step inside and you are surrounded by trees on every side, it really made me thankful for having the opportunity to see something so great. I think I got



Keel-billed Toucan. Belize.

closer to God this week, also, because it is just amazing to me that this is his creation. And I am just really glad that I appreciate it. The rainforest is also inspiring to me. ~Nora Whiteis

This trip has just been absolutely wonderful. I feel that I have gained so much in just one week! Its almost unbelievable. I only wish that everyone else had the same opportunity – maybe then they would realize just how important places like this are. I have had so much fun! ~Neomi Tio

This trip has been one of the best experiences of my life. Last week at the rainforest not only did I learn so much about trees, plants, and birds, but I also learned a lot about life. I learned that there is more to life than beauty, money, or possessions. I know

that I am going to go back home different than I came on this trip. Being on the island has been very different. I am still enjoying myself, but there is a lot of time to think about life and the life I lead. I have had time to examine my heart and to realize how small I am. This trip has been awesome and I am so thankful that I've had this opportunity. I really hope that in the future I can visit the rainforest again. ~Merrill Bomar



Red-eyed tree frog. Belize.

continued on page 36

Ecuador 2005 Galapagos

Swam with Sea Lions around us – cool to see such graceful supple animals in their natural habitat. Quite a few sea lions on beach including one large male; many females; pups nursing. Some of boys and I snorkeled with sea lions! They also saw some sea turtles which I missed. The arid zone down on the beach is very desolate with lava rocks, cactus, thorny trees, and shrubs. Beaches here are fairly light colored, medium coarse sand. Animals, as expected, show no fear toward us. One finch pecked on Drew's toe as he sat and read!

As we headed back up to station I got Shelley who was in front of me to turn around and look at a Cactus Finch. When she did she saw the whales, not far off shore, tail-slapping the water. Mother and young both did it over and over. We could see the white below their tails. The baby then breached! And as a farewell gesture the female raised her right flipper and swam with it straight up while occasionally slapping the water. Awesome! I would guess her flipper was 6'-8' long!

Panama 2007

Highlight of this course was visit to Embera village. Rode in pickups out to main road where tour van picked us up and took us to river to dugout canoe that took us upriver to the Embera Village. Two Indians at front with poles kept us off of the rocks as outboard pushed us upstream. Beautiful river with forest on both banks. Water clean and clear. Fish in bottom of the boat probably our lunch. Three species of kingfishers as we went upstream – Ringed, Amazon, Green.

Embera men in loincloths and some beads, women in short skirts and beaded tops. Open family huts on stilts on a high bank above a beautiful bend in the river with rapids. People very nice – lots of cute kids running around. Had lots of crafts for sale – I bought a carved loggerhead to give us good karma with the turtles on the turtle beach – which we would visit later in the course. Each of the kids rubbed it for good luck.

Cana – second half of a Bocas del Toro/Cana custom Panama 2007 course

Once we flew over Darien N.P. the rainforest was spectacular with beautiful emergents rising above the canopy. Flowering purple (tropical almond) trees give color relief to a million shades of green. Saw one white hawk flying below us. Flew up a valley with steep hills on either side. A few waterfalls could be seen coming down the steep banks of the hills. Pilot flew directly into Cana. Kids were excited and enjoyed having a good look at runway through cockpit. They clapped upon landing on the narrow grass runway.

Great birding morning – Black-tipped Cotinga right behind dorm – great looks. Lots of Toucans – at one point 7 in one tree with both keel-billed and chestnut-mandibled. Then while we were eating breakfast a Black-and-White Hawk-Eagle flew nearly to site and perched for us. Unbelievable through scope with piercing eyes and black ceres. Talons and beak very impressive.

Description of Pirre Mountain cloud forest solo experience in Panama

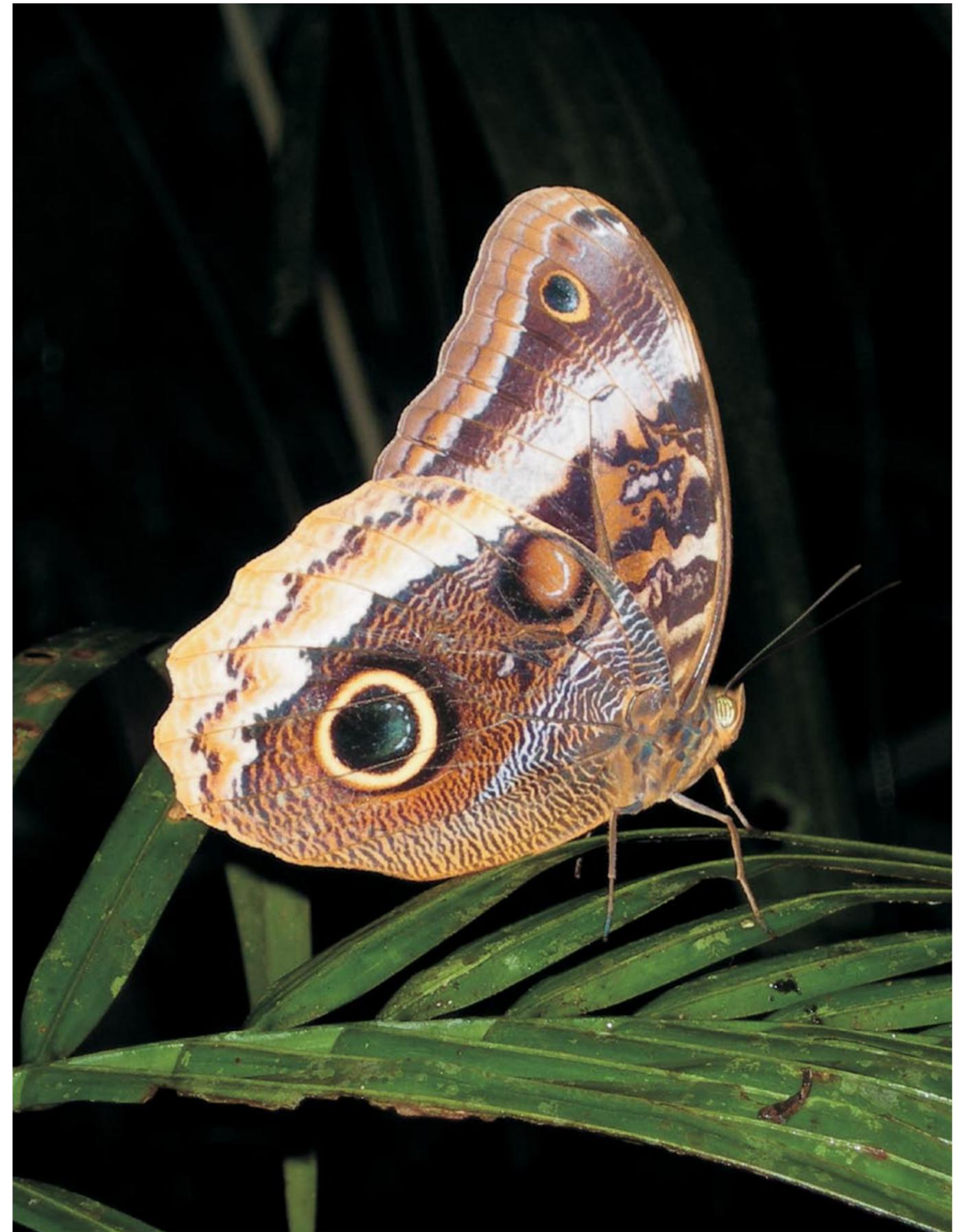
Rick then surprised us by taking-up watches/ipods and setting us out for our solos. I had a great spot where I could see tops of several trees. Everything is so wet. Clouds intermittently passing through trees gives a spooky cool feel to things. Lushness of mosses, ferns, epiphytes always amazes me! Everything is a shade of green! I was last one collected so had about 1 hour 20 minutes out alone. Fantastic. Kids seemed to enjoy it mostly and were excitedly energized afterwards. Saw lots of Pirre Bush-Tanagers and a solitaire. Grayson saw a Rufous Nightjar get mobbed by smaller birds and land and stay right where Rick put him. Kids were all there when I got there to see it. Like all nightjars it was confident in its camouflage as it perched head down. Its "whiskers" were impressive. Beautiful deep cinnamon color with lighter speckles.



Our plane leaving us at Cana.



Dan with his students at the Cana Field Station in Darien National Park. Panama.



Owl butterfly. Belize.

Student comments in my journal:

I told you in Bocas that the beach was my favorite experience, but I was wrong. I am so glad that I decided to walk to the top of the cloud forest. It was amazing! Solo time up on top of the mountain was a very enlightening experience. Up on the mountain I realized how sad I am going to be to leave Cana. There was so much to look at in my small portion of the trail. I've discovered that I don't think I can be satisfied with life if I am not in some way helping this place and places like it. This trip means so much to me, I feel as if in these past two weeks, so much of my life has changed. Many of my plans for my adult life have crumbled and in their rubble, new plans have emerged. ~Tracy Day

This trip has been everything I had hoped it would be and more! The other day I was reading on the back porch of Cana and I read a quote in the opening of a book that seemed to explain how I felt.

"I am a part of all that I have met. Yet all experience is an arch where-thro' gleams that untravelled world, whose margin fades forever and forever when I move.

~ from ULYSSES, ALFRED, LORD TENNYSON

The more I learned about the rainforest, the more complex and grand it became to me. I always knew that I needed to "Save the Rainforest", but I never really knew why. I actually got to experience for myself how the rainforest supports life, resources, cultures, and economies. I have never experienced anything like flying into a place where you can see miles and miles of rainforest, and get to stay in the middle of it! This trip has made me look at the world in a new perspective of wonder and curiosity. ~Tiffany Steele

Well this trip has certainly been one of my most memorable ones! Especially the first night we were there and I saw those

two snakes and almost stepped on one . . . now that's some scary stuff. Well I'm glad that I got to come and see so many amazing things and travel to some amazing places. And also seeing the Keel-billed Toucan was awesome! I'm so glad that you found it in your scope. Also whenever I found a bird that we had not seen on the trip before was so cool. ~Scott Phillips



Sunset in the Galapagos

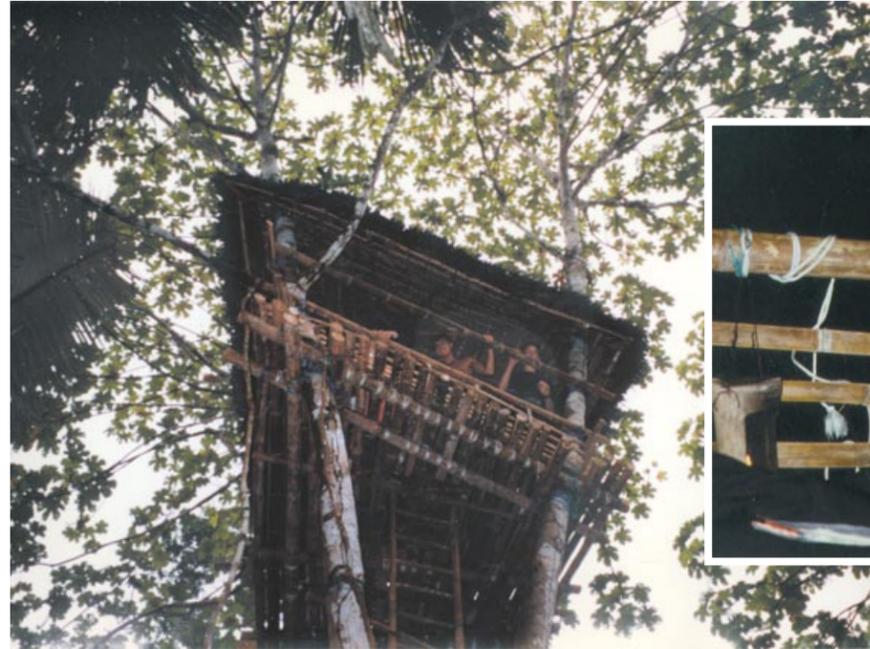


Dan Patrick, his wife Leslie, and his children, Drew and Dana, atop a Mayan temple at Lamanai.



Blue-crowned Motmot. Belize.

Blessings of a Broken Leg



By Mary Ann Gregory.
Teacher, Dysart-Genesco Elementary School.
Dysart IA



Night in the hut

Tree crew

Traveling over the continental divide on a trip to Eastern Ecuador, my spirits were high. The group of teachers and students from all over the United States was enroute to the upper reaches of the Amazon. We would learn about the culture, plants and animals. We'd take a rugged hike to the Napo River, stay three nights with an indigenous tribe and come back by dugout canoe.

The bus stopped high in the Andes Mountains. We were told to see if we could discern why the highest trees in the tree line weren't covered with moss and lichens. I scrambled out. Using my binoculars, I could see that those trees shed their bark. No growth could cling to them. How fascinating! My friends went down a steep gravel trail leading to the site. My brain said, "Don't go there. This is not for you." But my friend Pat went, so I did too. I fell face forward. Suddenly I was in too much pain to speak. The journey had changed. My leg hurt too much to walk. The strongest of the men carefully carried me back to the bus. Others helped to cushion my leg with sweatshirts and jackets.

Finally near the end of the day we arrived at Jatun Sacha, the biological research station where we would stay. A local man made a crutch for me from a forked stick, a piece of bamboo and a towel. I was glad that I had tall sturdy hiking boots. They helped to hold my ankle in place and by using the crutch, I could drag my injured leg very slowly.

Judy Logback, a new volunteer at the research station, befriended me. She insisted that I see a doctor and so she called a taxi, which turned out to be an old blue pickup truck. As we rode toward the small city of Tena, the truck stopped

repeatedly to pick up natives on the way to market. They climbed into the back of the truck with their bananas, chickens and other goods.

At the hospital my leg was x-rayed twice. I had to pay immediately- two dollars for each x-ray. The doctor was capable and kind, but had no supplies to work with. I gave Judy some cash and she ran across the street to a pharmacy to get cast materials and rubber gloves for the doctor. With a cast on my leg, my new best friend, Judy Logback and I rode back to the research station. I still couldn't walk, and I had to watch the backs of my friends disappear into the rainforest for three days of adventure. I sat on a little chair near the research station, alone and forlorn. Judy took one look at me and said, "You're depressing. I'm going to have to do something with you." She gathered two sheets and two long bamboo poles. Six young research interns held the poles parallel to the earth, while Judy tied the sheets to make two big slings - one for me to sit in and the other for my broken leg. I was carried several kilometers through the rainforest, over a bridge so narrow that the interns had to walk through the river while I was held above the bridge, and I was finally put down under a tree at whose top, in the emergent layer, an earlier visitor had built a bamboo hut with a thatched roof. Another visitor had left mountain climbing gear.

Judy, being a can-do creative genius, rigged the gear so that I could be lifted to the hut. She tried it first. It worked. I was hoisted to the upper level of the tree house. An intern had climbed the narrow bamboo ladder, crawled through the trap door and was ready to pull me over the railing to the bamboo floor of my new abode. Judy returned quickly and climbed the

tiny ladder easily, with my duffle bag on her shoulder. She spread out my sleeping bag and that's where I sat and slept for three days and three nights. The hut consisted of a bamboo floor, railings and a thatched roof. There were no walls. A trap door in the floor provided access to the ladder.

Though still in great pain, I was thrilled. My misfortune had turned to bliss! I looked down to watch troupes of golden saddle-backed tamarin monkeys travel through the canopy. The gigantic leaf of a neighboring tree harbored a huge, hairy tarantula, which came out to sun. When it rained he crawled under the leaf. In the evening a furry-faced fruit bat fed on large trumpet-shaped flowers near the railing. Then I heard running footsteps and someone coming up the ladder. It was Judy again, with a container of food and some candles. She lit one candle, and dripped wax at intervals on the top of the railing, and set the candles there.

Sunrise and sunsets were astonishing from my perch above the canopy. The local premier birder had heard about my plight, and he climbed up one morning to help me identify birds. We didn't speak the same language, but we worked well together. We'd spot a bird, and then Eduardo pointed to it in my bird book so that I could learn the name of the species. Among the many birds I saw were white-bearded manikins, a black caracara and a rufous motmot. A roadside hawk watched me from a distant emergent tree. Also, many beautiful butterflies gathered at the one spot on the ground where I tossed the contents of my chamber pot.



Coming down

When the group returned from their adventure, Pat, an acrophobe, climbed up to visit me after it was too dark to see how scary the ascent was. She came through the trap door, white-knuckled and grim from the climb, to tell about the trek to the indigenous Kichwa community. She had an opportunity to shoot a dart through a blow gun, eat local food and ride in a dugout canoe. It was made more thrilling when her canoe capsized. The next morning Judy arrived with the interns. "It's time to come down," she hollered

I didn't want to leave my aerial Eden. "I'll just stay here. I like it." As long as I sat still, the pain was tolerable.

"No. You're coming down now," yelled Judy

A young intern scampered up the ladder and through the trap door. Soon I was being brought back down to earth. I was carried to a crude cabin that had been vacated by a scientific researcher who had just finished his work. Later, outside the cabin door, our guide showed the group how to plant a pineapple. Unfortunately the digging disturbed a swarm of army ants. The insects marched up the side of the cabin and inside. They covered every inch of the rafters and corners, removing cocoons and spiders as they went. My cabin was also the place where our group met with the son of local shaman. He taught us about healing with native remedies. He offered a sip of a strong healing potion to all who were present. I didn't pass up the opportunity. It tasted like a dirty ashtray. I waited in vain for a miracle. My leg did not get better instantly.

But I was distracted from my leg when I learned about a craft co-op Judy Logback had developed among the villagers. She had noticed their bead necklaces, bracelets and carved wooden arrows, bowls and woven baskets. She envisioned that villagers could sell these crafts through a co-op as a way to earn an income. The locals agreed. That would be a way to gain income without cutting down trees of the rainforest. This project, called Kallari, turned out to be a big success. It now sells crafts and award-winning chocolate around the world. I brought a supply of Kallari crafts home with me, and have sold them at teacher conferences. I also sold a supply to the gift shop at the Texas State Aquarium in Corpus Christi. The chocolate bars can be found at Whole Food stores in the U.S. Search "Kallari" on the internet and you will find more information.

When I got back to work at the Dysart-Geneseo Elementary School in Iowa, I taught my students what I had learned on my trip. They wanted to help the Kichwa children of the Napo Valley, who attended school in a cement block building with half walls and a thatched roof. My third graders poked banana slices, pineapple and mango chunks on toothpicks to make fruit kabobs. They were sold during recess time. Profits were sent to the Kallari co-op, so that more school supplies could be purchased for their children.

We also turned our classroom into a rainforest, and I taught about conservation. We looked for parallels between the rainforest and the reconstructed prairie on our school property. I spoke to many social service groups to tell them what I had learned. All this from a broken leg during a trip that I thought was ruined.



Touchdown

Abington Heights Middle School

CLARKS SUMMIT, PA



Student reflects on a Costa Rican mountaintop

By Mike Freidlin, Science Teacher

Since 1991, Abington Heights students have been going to the rainforests in Ecuador, Costa Rica, and Panama. Through Save the Rainforest, more than 300 students have gone on 30 trips with science teacher Mike Freidlin. In addition to the obvious sights and sounds of the rainforest, the true benefits of each trip are what each student learns about our planet, how to live life with minimal environmental impact and most importantly, what each student learns about him or herself. Students learn the many gifts we receive from the rainforest shape who we are and what we will become.

“Panama and Costa Rica showed me more beauty than I thought existed in the world. It changed the way I view all things. I hope that one day I will be able to return to see my friends once again!” ~ Austin (Panama and Costa Rica)

“Sitting under a warm Panamanian sun on chalky white stones on the bank of the Rio Chagres, I realized just how trivial life outside the rainforest can be. The seven-year-old boy with whom I was sitting knows nothing of modern conveniences or technology. He doesn’t speak the same language as I. Yet, both of us are having the time of our lives. I hope to soon sit with my Indian friend once again.” ~ Josh (Panama and Costa Rica 2009)

“My life is forever changed because of these rainforest trips to Panama and Costa Rica. I have become more compassionate and have gained an outstanding and irreplaceable respect for the rainforest and the environment. A lifetime without the rainforest is no life at all.” ~ Bess (Panama and Costa Rica 2006, 2007, 2008)

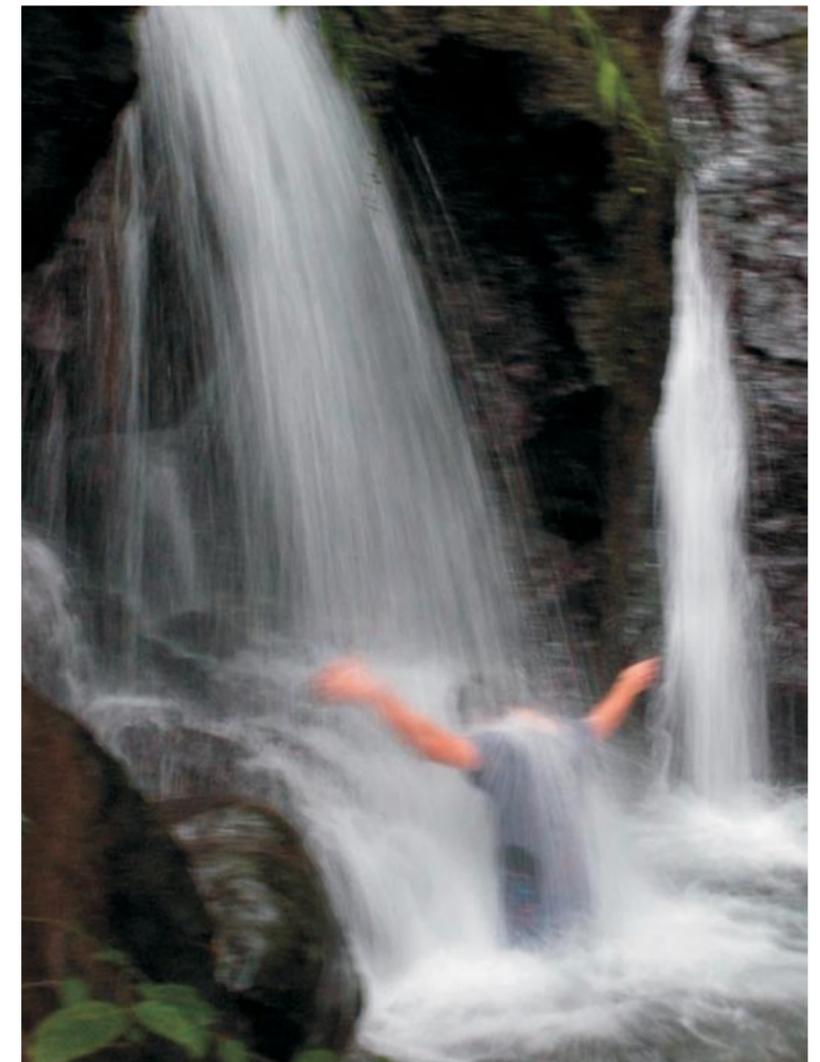


“From two trips to the rainforest I have learned that indigenous people rely on rainforests for physical and cultural survival. Rainforests supply these people with food, wood and medicine. Here, the medicine man is using a rainforest plant to treat acne. This man uses rainforest plants to treat numerous diseases such as asthma, diabetes and cancer. He, as well as all the Indians, is the most kind, generous and compassionate person on this planet. I have completely fallen in love with the rainforest and the Indians who live there.” ~ Whitney (Panama/Costa Rica 2006, 2007)

“I realize how crazy I sound when I say this, but I made friends with a tree named Archibald on my solo in Corcovado National Park. I promised to keep him safe and I plan on keeping that promise. However, I didn’t just make friends with trees. I also made friends with the indigenous people in the village of Parara Puru. One of my friends is Joseph. He was really quiet, but a bundle of fun. I didn’t realize how much fun a quiet seven-year-old could be. These friends are currently protected because they are in national parks. However, many of their distant relatives are not. “Save The Rainforest” has done and continues to do very admirable work. By allowing today’s teens to experience the wonders of the rainforest, there is hope for my friends. In order to keep my friend in Parara Puru out of harm’s way, my friend in Corcovado must remain safe.” ~ Karly (Panama/Costa Rica)



Rainforest brothers



Costa Rica waterfall



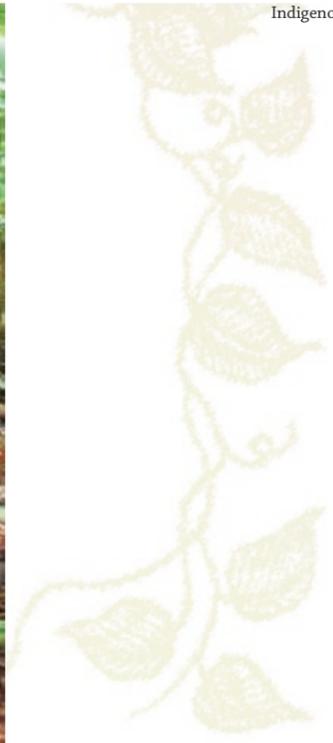
Tropical pharmacy



Rainforest classroom



Indigenous handcrafts



One big very happy family



Traditional dances with the Embera

Ivy Tech Community College

KOKOMO, IN

By Chancellor Stephen J. Daily

Jonathan Bedrava carefully folded sheets of colorful paper for the crowded classroom as students and teachers eagerly watched in anticipation of trying their hand at the ancient Japanese art form. The classroom, however, was far from our Ivy Tech Community College Kokomo campus. It was in the small village of Buche on the northwest coast of Ecuador.

Nearly every year since 1991, I've taken students, alumni, faculty, staff and community members on Save the Rainforest learning expeditions. As chancellor of Ivy Tech Community College's Kokomo Region, one of fourteen regions within Indiana's statewide community college system, I am thrilled to be able to offer this experience to the Ivy Tech family. It is not every day that you get to learn Central and South American dances from indigenous people, taste their authentic cuisine or experience their way of life. How often do students get to learn about tropical ecosystems, plants and wildlife by touching the leaves or watching the animals in their natural habitat? The trips have been invaluable to the college — opening doors for students who otherwise might not have opportunities like these. The students themselves have appreciated the trips.

"It was a life-changing experience," said Bedrava of the trip. "We learned as much from the people that we met as the kids did that day in the classroom. We were taken out of our comfort zone many times. What we learned can't be found in a book."

Save the Rainforest trips and others like them are what comprehensive community college's are about. We were able to provide scholarships for two of our students. We try to provide as many opportunities like this as we can for students each year. This trip is one that makes such a huge impact on their lives. It's also great to see them interacting with alumni and faculty who travel with us. It gives them a totally new perspective on the world.



Mayan ruins like these made history and culture come to life for students, alumni, faculty, staff and community members who travelled with the college to Belize in 2008

For Amanda Hood, a single mother and student worker at the Logansport campus who went on the 2007 trip to Ecuador and the Galapagos Islands, the trip exceeded her expectations. "Although I missed my family, I'm so glad I went on this trip and I thank the college for making it possible. I learned so much about myself and about working together to make great things happen. One of my favorite parts of the trip was seeing how excited the kids were when we gave them the school supplies that we brought. Even the teachers were so thrilled. It seemed like Christmas as they divided the things we had spread on a table. I plan to organize an effort through student government to send more items to them in the future. A trip like this makes you realize just how much we have and how important it is to give back."

Amanda gained a lot from that 2007 trip, but it was truly a life-changing experience for Bedrava who, in May 2009, married Ecuador native Nathalia — the tour guide he met on the trip. He since has returned to Ecuador three times and

hopes to one day work in a technology firm in Quito.

Ivy Tech Kokomo Director of Student Life Alayne Cook, who herself has traveled with us several times, agrees that students gain a lot from these trips.

"It's been so great to watch students experiencing what they have — to see them function so well in a completely different environment."

I, myself, have been so impressed with the overall experience that I've taken my son Paul on the trip twice. His perspective, as a high school student during the first trip, was like so many others who have went on the trip.

"The memorable experiences are countless," says Paul. "Starfish bigger than my head, birds that look like pterodactyls, plants that close when you touch them, the sounds of howler monkeys at night, school girls performing a traditional dance, swimming with sharks, and waiting early mornings for the chance to see a jaguar — those are the types of things that top the long list of truly transforming experiences."

"The first trip was my first outside of North America," he continues. "The majority of the group were high school students from Utah. I saw many amazing things, but perhaps the most joyful was seeing the teenagers from Utah experience their first night with fireflies. They ran around like 5-year-olds, chasing, holding, letting go and chasing again the fireflies. Since I'd grown up with fireflies, it was the only time in the trip I was able to sit back and bask in the joy these new experiences that were brought to people. The rest of the time, I have no doubt I acted like those teenaged five-year-olds, running from leaf-cutter ants to exotic plants to Mayan pyramids."

From the two trips Paul has been on, he says he's gained an understanding into the delicate balance between human beings trying to make a living versus the need to protect our rainforests.

For us, Save the Rainforest trips make the world our classroom. I can't think of a better way to teach...or learn.



Ivy Tech student Jonathan Bedrava teaches Origami to students in Buche, Ecuador



Girls in Ecuador perform a native dance for our group



Porpoises greet our group, swimming playfully alongside us, as we made the trip from Ecuador to the Galapagos Islands.



Members of the 2007 trip to Ecuador and the Galapagos Island pose for the camera at the center of the world. The spherical monument behind them boasts that distinction.



A tour guide describes the remarkable vegetation found along a stop in Belize

Keene High School

KEENE, NH



Reforestation project, planting native tree species

By Cliff Lerner, Biology Teacher

Reflections from Panama.

I had been to tropical rainforests before and I didn't expect my senses to be overwhelmed. So when I took off alone on my early morning walk my first day in Soberania I was moved by the serene beauty of the forest but I was not prepared for the bombardment of strange sounds, incredible smells and stunning images that surrounded me. And especially, the warm softness around by hand as I reached into the refuse of a leaf cutter ant's nest. I assume the warmth is due to the decomposition of the organic matter by bacteria. The ants fascinate me and this curious observation will set the tone for the rest of my trip.

As Deborah (one of my student's) meets up with me, I am delighted that she seems to share my curiosity. It seems she shares my sense of adventure too and does not hesitate to place her hand on a Cecropia tree to "invite" some of those ants (I

believe Benny called them Azteca) to attack her. They oblige her, but she quickly shakes them off laughing with excitement. She's only sorry that I didn't have my camera with me. The story of how these fast growing trees develop a mutualistic relationship with an ant species, is a wonderful example of the complex interrelationships one finds in tropical forests. And now we are becoming fully immersed in that complexity and loving it!

OK, by now I'm really into the different kinds of ant species (I'm sure I'll read more by E.O.Wilson when I get home.) But later in the day I find a really large ant (over 1 inch) and start to observe it up close and gently nudge it with my fingers. An even bigger hand grabs my shirt and forcefully pulls me back with a shout of "Cliff are you crazy?" I was reprimanded by Benny (our guide) because I was tempting fate with a very dangerous Paraponura (sp??) ant. He told me of a friend of his who spent a couple of days in the hospital from one sting of the so called "Bullet Ant."

One of my students (Jeff) commented on our guide: "Benny is a great guy—very warm and funny too. He really knows his birds and teaches us in a way that makes us want to learn. He has an incredible passion for frogs as well and I get a charge watching his exuberance as he encourages us to hold an orange colored Dendrobates frog. Very cool stuff!"

My thoughts on Benny are similar. What really impresses me is his understanding of the big picture. Example...he worked to establish a community action program near Colon to involve locals in protecting their own environment in a sustainable way.

Our time with the Embera villagers brought some contrasting views from my students...

"The pristine environment with a village perched above a perfect river; wonderful swimming and really enjoyed playing with the local children."

"Conflicting feelings because it is so beautiful but it's all sustained by ecotourism-its authenticity has been lost to me."

"Absolutely an amazing place with beautiful people who are so friendly to us."

"On a platform overlooking the river, I saw more birds in the morning than on the entire the trip!"

Here's a paragraph from my journal after spending the night in the village...

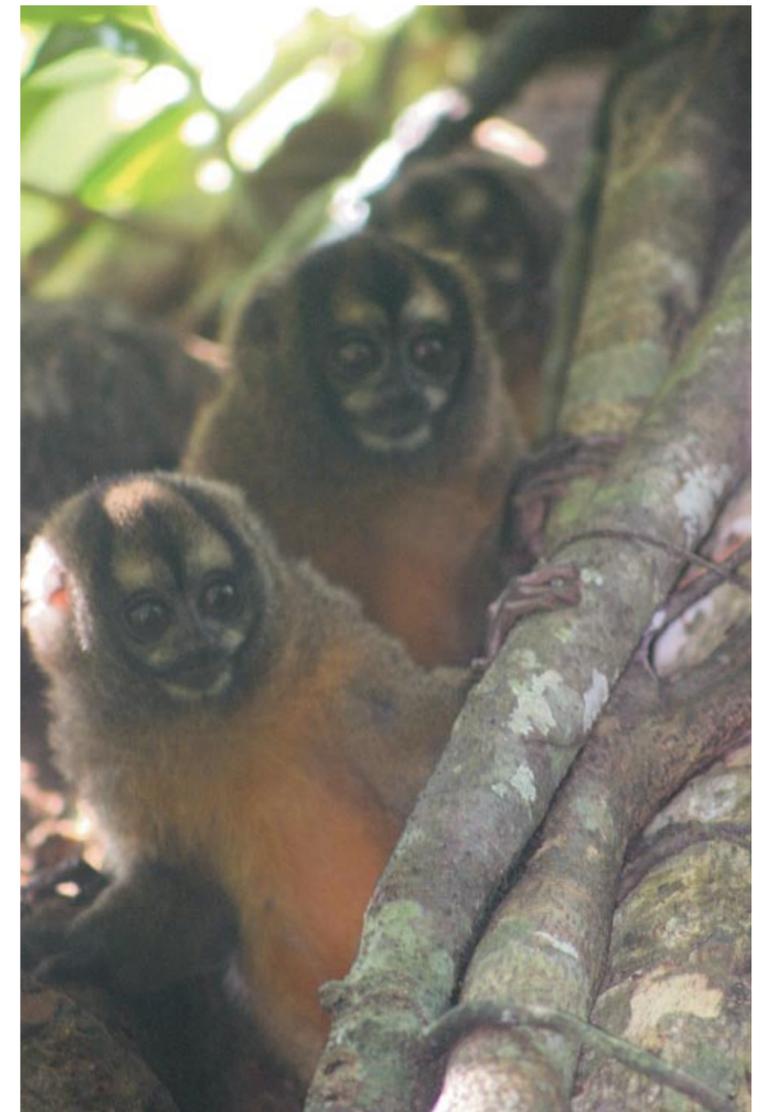
"Woke up at 6 am to some strange bird calling-wish Benny was here to help me ID it. This is a very special morning. Everyone else is still in bed except for some of the Embera women. *continued on page 51*"



Embera elder showing how palm thatch is used for roofing



Student looking at large leaf cutter ant nest



Night Monkeys. Panama



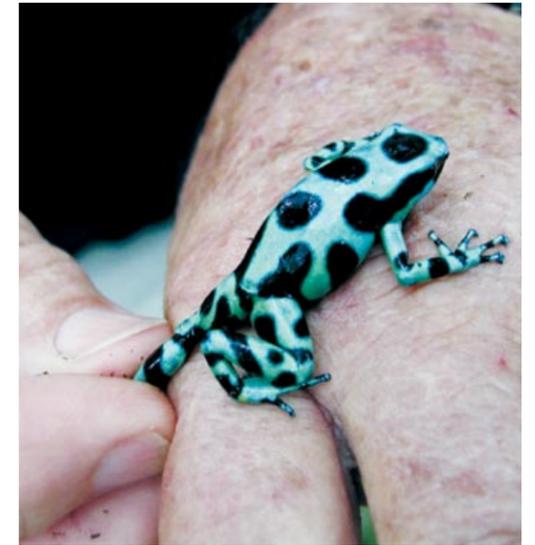
Group in the rainforest



Course participant with Capuchin monkey



Student looking out over Pacific Ocean at Punta Patino station



Posion arrow dart frog



Cliff and an orphaned margay (full grown)

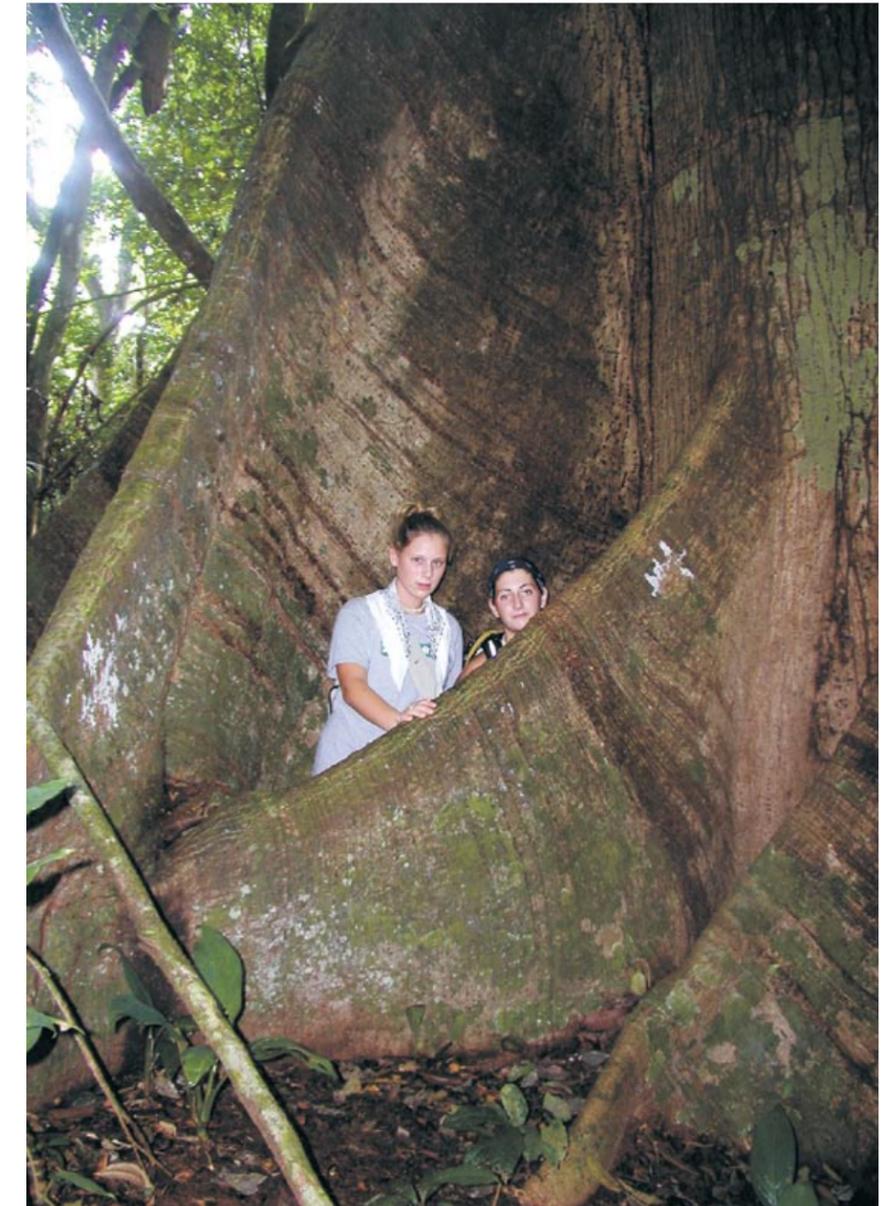


Tree Fern. Panama

A fire has been made for cooking and the light smell of burning wood complements the soft morning breeze and the singing birds. I go for a swim in the river-it's moving quite fast over many large rocks, but I find a sandy spot where the current is diverted and slow enough to let me lie down, embedded in the sand with the gentle current just enough to massage me. How perfect this is! Almost floating in a jungle paradise-looking up at the steeply forested slope on one side, and watching the spreading sunlight envelop the Embera village on the other bank."

Dogirama (the embera shaman who calls himself a botanist) took us on a walk. Jeff, who has asthma was particularly interested in some of the purported cures from certain plants. He tried one of the painkillers which really did numb his tongue. However he chose not to try the so called "Viagra" plant! Got a great picture of him looking at the plant with a big grin on his face- actually I think he was trying to get me to try it instead!

A highlight of the trip for me- a visit (by boat from Bocas) to Cerito farm. This is a Cacao plantation run by a couple of ex Americans. They grow their trees in the shade (preserving much of the ecosystem) use organic techniques and produce a delicious chocolate that we happily sampled. Amidst their beautifully landscaped farm are several species of orchids and one wild Margay! Apparently it likes to hang around the farm and it has gotten so used to people, that I was able to coax it onto my shoulders. What a cool moment that was for me. One of my kids thankfully got a picture.



Students standing behind buttress roots of Ceiba tree

St. Albans High School

ST. ALBANS, MO



Students gathering sea turtles for release

By Margaret Eisenberger

The CDS Middle School students flew into Puerto Vallarta last Sunday and then drove south to Camp Mayto, where the University of Mexico at Guadalajara conducts sea turtle conservation. The project is run by a professional biologist from the university and staffed by volunteers, mostly provided by Global Volunteers, a UK non-profit that provides Gap Year volunteer opportunities all over the world. On our very first night on patrol we discovered a turtle just as she finished laying her eggs. We watched her bury them and return to the sea, then dug up her eggs. Some of us carried them back to camp while others walked farther and found a second new nest to dig up. The camp had a fenced corral within which we dug the same shape of hole for reburying the eggs. The fence protects the nest from poachers and predators. That night we retrieved and reburied 227 eggs.

Over the next few days, we also learned to open nests that were old enough to contain hatchlings. We collected them and waited for darkness to release them into the sea. We also cleaned out nests from which the hatchlings had emerged on their own. In these, we found many scraps of shells, along with putrid, slimy eggs that never hatched and maggot-ridden hatchlings that had died without ever having reached the surface. That was the yuckiest part, but one of our students

actually discovered two hatchlings that were still moving weakly and was able to revive them before releasing them into the sea!

Strolling the beach in the middle of the night was an awesome experience. The Milky Way was brightly visible thanks to a tiny crescent moon. We identified some familiar constellations and planets, tracked satellites across the sky, and even saw a few shooting stars.

On our last morning in camp, we gently placed 289 hatchlings on the sloping beach and sat in the predawn light in silence, watching them struggle against the waves which often tossed them back up, before finally disappearing into the surf. While we were doing that, the staff had retrieved 13 nests' worth of eggs. We returned to camp and quickly dug the 13 required holes to rebury these eggs, too. Accomplishing this rapidly greatly improves the viability of the eggs, so we know we were instrumental in helping many more turtles survive.

During our stay at the camp we also visited another beach where we could swim, took a boat ride around the bay looking for swimming turtles, hiked through pristine rainforest to a river with cascades and pools for swimming, and planted well

over one hundred tree seedlings at a nursery that helps with reforestation. We ate outdoors, played on trampolines and swam in large freshwater swimming pools, slept on the trampolines, and took our siestas in the shade underneath the trampolines! The food was simple, but plentiful and tasty.

In addition to the turtles, we also touched a gila monster caught by the staff, laughed at the antics of a pygmy mouse opossum picked up while on patrol, and observed a preying mantis, many kinds of frogs, a walking stick, lots of lizards and geckos, pelicans, magnificent frigate birds, beetles, hermit and other kinds of crabs, an armadillo, a dolphin, and a roseate spoonbill.

After leaving Camp Mayto we drove to Tenacatita and checked into a hotel. Here we were able to swim in a pool or in the ocean any time we wanted. We visited a coconut farm and learned to drink the milk and eat the meat with lime or chili powder. We went to a nearby cove and snorkeled right off the beach, amazed by the colors and numbers of reef fish surrounding the coral.

Finally, we drove back to Puerto Vallarta, stopping at the Chamela Dry Forest Reserve Research Station where we saw Stanford students recording their research on computers in the air-conditioned library and heard about the region from the director of the station.

In Puerto Vallarta, we were again able to swim in the ocean right in front of the hotel. Later in the afternoon, we strolled through Vieja Vallarta and shopped at the various crafts booths, photographed the unusual sculpture on the malecon, watched the costumed acrobats who twirl from a tall pole (head down!), and ate authentic Mexican tacos in a picturesque restaurant. Afterwards we enjoyed an outdoor dance interpretation of the life of Frida and walked back to our hotel in a light rain.

The eggs we buried are due to hatch between Halloween and November 10. We hope to have a birthday party for the approximately 1600 sea turtles we directly helped to survive!



Boat Excursion to swim with sea turtles



Student drinking coconut water



Students working in tree nursery



Gathering sea turtle hatchlings for release

J.C. McKenna Middle School

EVANSVILLE, WI

By Butch Beedle, Social Studies Teacher

"For in the end, we will conserve only what we love. We will love only what we understand. We will understand only what we are taught." ~Baba Dioum, conservationist, Senegal

"We are in the middle of nowhere, but in the heart of everything." Carly, student from Evansville, Wisconsin, describing her experience in the rainforest of Panama.

Howler monkeys serenaded us each day. Parrots burst out of the jungle in noisy flocks. Lizards scurried up the sides of trees to avoid our coming presence. Giant blue morpho butterflies flew overhead trying to catch a glimpse of the streaked sunlight. A quick peak at a coatimundi. Trees as wide as a room. Giant toads invaded the landscape at night along with tarantulas, scorpions, and the ever-present bats. Paradise? It was to several groups of Evansville High School students from Wisconsin who took the adventure of a lifetime by traveling to the rain forests and coral reefs of Panama. These students were exposed to the beauty, history, and people of this small country.

Panama is a tiny country that is less than 50 miles wide in some places, but has an unbelievable amount of wildlife and history. Students from our school have been participating in Save The Rainforest's two-week adventure in Panama for a number of years. This exceptional educational program through Save the Rainforest and ANCON Expeditions shows students a variety of ecosystems, history and cultures. Panama is a fantastic country to visit because in a small area it has so much to offer. There are beautiful coral reefs, rain forests, and huge metropolitan cities. There are indigenous native cultures still practicing their traditional customs. There is history going back to Columbus and pirates of the Caribbean. Panama has it all.

We needed to travel 2,441 miles in one day. That was the distance from Evansville, Wisconsin, to Panama City, Panama. The students were flown to Panama City and whisked to a rainforest education lodge only 45 minutes away in the Panama Canal Zone. The Canal Zone is kept as prime rain forest to protect the canal from siltation. Howler monkeys and parrots called during the day. Frogs serenaded us to sleep at night. It was the rain forest we came to see, and it was right outside our door.

"I'm not sure how I went to sleep with the constant chorus of wildlife." ~ Michael



Forest hike



Our first day always begins with a pleasant walk in the forest. ANCON Expeditions always provides us with great guides. Our guide, naturalist and teacher, Alvaro "Al" Perez, began by showing us a leaf cutter nest that was as big in area as a ranch house. He estimated that there were 50 million ants in this gigantic colony.

Al showed us a large hanging paper wasp nest right next to an azteca ant nest. He said they are frequently found near each other.

"The wasps protect the ants from anteaters. Anteaters love azteca ants, and the wasps also protect the ants from invading army ants," instructed Al. But then he did something that made the hikers gasp. Al put his hands on the nest of the aggressive ants. And as you might have expected, they swarmed onto his hand and arm. As he brushed them off, he crushed some of the ants on his skin. Their squished bodies left an acidic aroma on his hands. He had us all smell his hands and explained that this was one of nature's insect repellants. He said he would not be bit by any mosquitoes on this hike. "Anyone want to try?" There were no volunteers.

Traveling on the trails was exhilarating. Students were prepared for an onslaught of mosquitoes, snakes and other assorted creepy crawlers. To their surprise there weren't that many. The treetops are the pastures of the forest, so most animals make their homes in the maze of leaves called the canopy. But in a short time, students got a taste of the vast biodiversity. Through the years we have been introduced to various ants, termites, toads and frogs of all colors. We saw birds big and small like, orange billed parakeets, whitenecked puffbirds, tinamous, toucans, various parrots, hawks, and blue cotingas. There have been snakes, crocs, opossums, coatis, skinks, bats, basilisk lizards, sloths, butterflies and multitudes of unknown insects. And then there were the monkeys. We have been peed on by howler monkeys and screamed at by capuchins. Unseen critters buzzed, whirled and clicked all day and night. It doesn't get any better.

"It was sweaty, hot, humid, muggy, and amazing. There was so much to see and take in. I loved every minute of it." ~ Charlee

"What an amazing hike. It took over two and a half hours. We could hear a manakin bird, which clapped its wings together to make a snapping sound. Al communicated with it by

continued on page 56



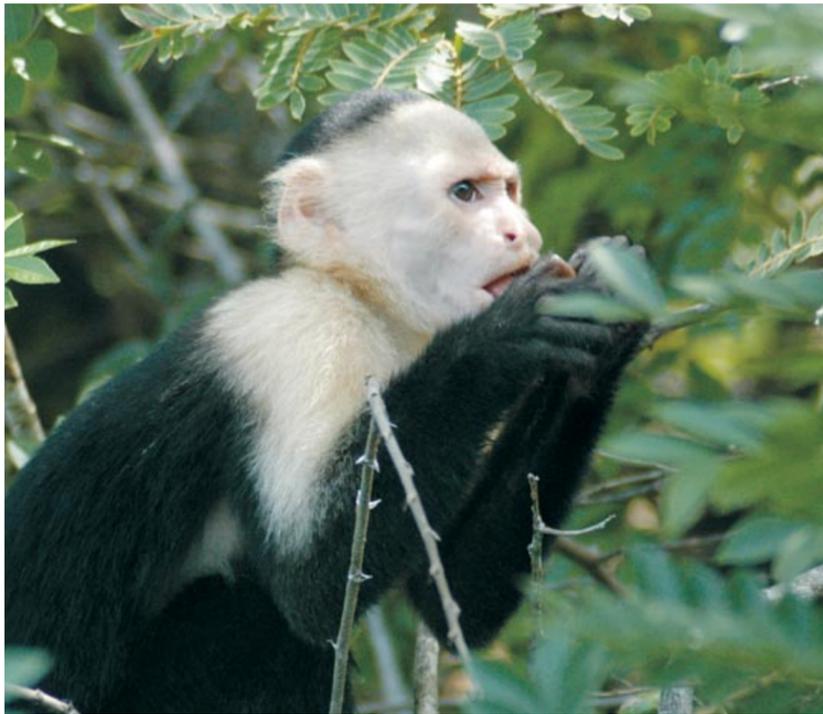
Photo by Steve Feeney



Butterfly



Photo by Steve Feeney



Capuchin monkey

hitting two fingers against the palm of his other hand. The bird would snap back.” ~ Adam

On one of the days, we took a couple of small canopied boats down a tributary to the Chagres River. The Chagres is the main water source of the Panama Canal along with 1000-foot ocean ships. Our goal was to see wildlife on the canal islands. When the Chagres River was dammed to create Gatun Lake in the middle of the country for ship travel, the mountaintops became islands. These uninhabited islands are teeming with life. We saw four species of monkey in one day, many sloths, and huge crocodiles.

At one point we slowly motored closer to find a small troop of white throated capuchin monkeys emerging from the greenery. They were feeding on guavas near the water’s edge. We docked our boat next to their tree. They were not afraid of us at all. They actually came down closer to the boat to get a good look at us. The dozen or so capuchins were animated and energetic. They swung about the branches using their hands, feet, and tail. Their small chirps sounded more like bird calls than a monkey. At one time, Al was sitting on the front of the boat and a monkey was only a yard over his head. He didn’t know the little rascal was there.

On the very next island were a troop of howler monkeys lazily laying in the tree tops. They don’t call them howler monkeys for nothing. Al began a call that sounded a lot like a series of dog barks. It set off a chorus of howls that was eerie and comical at the same time. Howler monkey males can be heard well over a mile away. Scientists think they howl to establish their territory from competing troops and as warnings to trespassers. They have been known to howl at most anything: sunrise, sunset, predators, thunder, or tourists. Al’s howl had to be answered with another howl. It was the howler way.

“Al howled at them, and then I gave it a shot. The boat driver thought I sounded like a dog. I told him that is all we have in the U.S. I don’t get much practice to do monkey calls.” ~ Adam

Inca gold. Spanish treasure. Pirates. History awaited us as we traveled to the Caribbean side of Panama to visit the Spanish ruins of Portobelo. Little Panama is rich in history. Panama was very important to the Spanish empire hundreds of years ago because stolen Inca gold could be carried across the country easily and then shipped to Spain. The wealth crossing Panama was staggering. It made Spain the richest and most powerful country in the world. Records indicated

that by 1600, 200,000 tons of silver crossed the trail across the Panamanian jungle.

We visited the ruins of the most important Spanish fort at Portabelo. Here, all the Inca gold was counted and cataloged. Of course, all this gold and silver attracted attention, especially the attention of pirates. This is where the English pirates Henry Morgan and Francis Drake tried to remove that gold from Spanish hands. The forts were heavily armed with many cannons and protected by walls 10 feet thick. These are some of the oldest buildings in our hemisphere. We saw forts and cathedrals that have been standing for centuries.

Today, the forts lay in ruins. We walked on top of the great Castillo de San Jerónimo inside the city of Portobelo and peered over the walls to view the magnificent harbor. This was the main stronghold and the last line of defense for the Spanish. Many cannons are still there, but the wheels have come off and the barrels have sunk into the soil. The structure was made to last, and it has for centuries. It was very cool to see something that old and walk the same ground as the conquistadors and pirates of the Caribbean. The students walked in the footsteps of history.

“Where there are forests, there are native people, and where there are native people, there are forests.” ~ Kuna Indian saying.

Portobelo was hard to top, but it got better. We were headed up the Chagres River to stay overnight in an Embera Indian village called Embera Drua. The students worried about where they would sleep, what they would eat, and, most of all, where they would look.

The Embera of this village have chosen to keep most of their traditional ways, and that included clothes, or more specifically, lack of clothes. The women are topless, and the men wear loincloths, which is a cloth that is wrapped through their legs and folded over a string on their waist. This was a little uncomfortable for our American modesty.

We were picked up by giant dugout canoes and piloted upstream. As we traveled deeper into the forest, the river got narrower and the trees got bigger. We were going back

continued on page 58



Butch Beedle and an Embera elder



Photo by Steve Feeney



Portobelo



Boat ride on canal



in time to primary forest and traditional people. After nearly an hour, we rounded a narrow bend in the river and there were women with bright red flowers in their hair and naked little children splashing in the river. On top of the high bank, men played traditional songs on handmade drums, flutes, and turtle shells. Never in our lives had we been greeted like this. We proceeded through the village to our new home, a hut on stilts with a thatched roof and no walls. We were back in time.

The Embera elders told us about their lives and customs. They fed us fish caught right in the river and took us swimming at a beautiful waterfall. One night, a village leader, Johnson, asked us upstairs to the meeting house to talk. We had been talking to the women and children and expected that he wanted us to go upstairs for more personal conversations. But that was not what Johnson had in mind. We sat on the floor in the darkness of the hut. A number of Embera adults came too, and Johnson began to tell us stories about Embera society. He told us many ancient tales from his heritage. He told them in great drama and humor. He acted out the scenes as if he were really there. We learned how to become a shaman, how men used to find wives, about the ancient monkey-men, and how music was made. This was truly an experience that could never be recreated.

As part of our Embera education, we were taken on a forest trail that began just outside the last house in the village. We went up and down a couple little hills into the dense forest. Mico, who we were told was over eighty, showed us the medicinal garden he used to help his friends and family when they were sick. Mico was called a "botanist" by Al, or, as others might say, an herbalist. He did not use any special spiritual powers to heal, just his knowledge of the plants. He also did not take money for helping people, but it was expected that they would return the favor with food or other items they had in the future.

Mico showed us plants he had collected from the hillsides and placed in his garden that could heal snakebites, headaches, and wounds. He gathered the stems of a small plant and instructed the students to chew on it, but not to swallow their saliva. The plant instantly numbed their mouths. Swallowing their spit would make their throat feel anesthetized. The plant was used

to reduce the pain when teeth needed to be extracted.

We were making friends and breaking down the cultural barriers that keep people from communicating. Sadly, we had to leave. Our time with the Embera was over. Would any of us ever see them again? Would indigenous people of the world still choose to live a traditional life in the near future? Had we seen one of the last remaining native people? These were questions we asked ourselves as we rode away in the large canoe. We waved goodbye to our new friends who lined the riverbank to wish us farewell.

"We were a little worried not knowing what a night intrusion would be like in the jungle. We walked in silence, listening, watching, wanting to see what enjoys the night." ~ Kitty

Al planned a night hike adventure for us that he anticipated would last thirty to forty minutes. Even though we had walked on the same trails earlier, night was a very different sensation. We marched in total silence as Al requested. There was no stopping for small "Al talks." Our senses were much more focused. Eventually, the sounds and darkness turned our nervousness into a serene kind of peace.

Our short hike went on for two and half hours. The forest was pitch black. The air was heavy. The frogs sang their nighttime choruses the entire trek. Each of us had a flashlight and would survey the undergrowth, tree trunks, and overhanging limbs for life as we slowly made our way along the path.

There were moths and varieties of insects everywhere. Scurrying along a small stream bank in the dancing light of our flashlights was a trio of small opossums. They darted in and out of the foliage looking for something edible. These little mammals looked unconcerned that we were tracking them. They were not the same as our local opossums in Wisconsin. These were very long and slender. They scampered into the underbrush and were gone as quickly as they had come.

There were many tarantulas hiding in their lairs along the trail. It became easy to find them as we started to recognize what their waiting places for prey looked like. We would shine our flashlights in a suspected hiding place and look for the telltale eye reflection.

The highlight of the quest was finding the poisonous fer-de-lance snake. It had stopped hunting and coiled up on the path. Only Al allowed his light to shine on it. We watched it as it slowly uncoiled and made its way over a log into the darkness. We were very cautious as it went about its business. It really didn't seem too concerned with us, but we were concerned about it.

Another journey from our jungle lodge was a visit to the Miraflores Locks at the Panama Canal. The locks and design of the canal system is an engineering marvel. Even today it would be very difficult to reproduce. Most people can never dream that a canal would be so fascinating. For some, it was so awe inspiring that it was their personal trip highlight.

We arrived and went up to a three-story observation deck to watch the canal in operation. Just as we got to the top of the deck, two huge ships simultaneously began to enter the locks from the Pacific Ocean. The ships were massive cargo carriers. They carried hundreds of brightly colored freight containers on their decks. Each freight container was the size of a semi trailer. These ships were nearly 900 feet long. That is as long as three football fields. The gate slowly closed behind a ship and within minutes, the chamber filled with water. Once the ships had been raised the 26 feet, the forward gate opened up, and the ship moved on to the San Miguel locks. There, the same process would happen. The ship would need to be raised a third time before sailing across Lake Gatun. The vessels would be lowered back to sea level with a series of three more locks before entering the Caribbean.

"Coral reefs are important to mankind because they are the rainforests of the ocean and this is where the food chain starts within the marine ecosystem." ~ Princess Basma of Jordan

The second leg of the journey was flying to the magnificent islands called Bocas del Toro on the north Caribbean coast. Our goal was to explore the coral reefs and marine biology, investigate island forests and visit indigenous villages. Our lodge, the two-story Bocas Inn, was built over the water with a breathtaking view of the sea. The whole bottom floor was open to the elements. This open space was our dining room, meeting room, social hangout and, eventually, dance hall. At the end of the

continued on page 60



Goby



Brittle star



Cleaner shrimp



Sea anemone



Sponge garden

Photos by Christian Gernez

lodge was a large deck from which the students could watch the amazing sea life or swim. Upstairs had five rooms named after the local islands. Each room had its own bathroom, shower and even an air conditioner! There was an upstairs balcony overlooking the water with deck chairs and more hammocks. A travel magazine had named the Bocas Inn one of the top 10 best kept ecotourism secrets in the Caribbean. We were in paradise.

Coral is abundant on the islands of Bocas del Toro. Each island has shallow coral reefs near its shore. There are 51 different kinds of coral on Panama's Caribbean coast. The most abundant types of coral in the area are lettuce, finger, brain, elkhorn, star, and flower. Their names say something about how each one of them looks. These waters also had some of the greatest populations in the Caribbean of sponges, brittle stars, unsegmented sea worms, and sea squirts. The biodiversity of sponges may be the greatest in the world, with over 400 recorded species in this vicinity.

Coral is found in shallow warm water. The ideal water temperature for coral to live is 77° to 82°. That makes coral very easy to observe, and the water was a very comfortable temperature. Snorkeling and coral watching go hand in hand. Each small outcropping of coral looked like a brightly colored miniature castle complete with spires and towers reaching up from the sea floor. There were purple ones, red ones, orange and blue. The variety and color dazzled the eye. Each crevasse, in each individually shaped coral, had hidden chambers that had the potential to hide any multitude of exotic sea creatures. Fish were everywhere. It was like swimming in someone's aquarium.

Al planned for us to snorkel in five different types of reef ecosystems. We began our marine adventure by snorkeling at "Alvaro's Point". It was named after our guide because he liked to take groups there. Alvaro's Point was next to a stand of red mangrove trees. Al gave us background on areas that have mangrove and coral in close proximity like this. Mangroves are trees that can live in salt water. The trees look very strange, growing in small island clusters in the water without land. Their intertwined stilt roots made an intimidating tangled maze. That maze is actually important to marine animals.

He told us there would be many small fish

at Alvaro's Point because mangroves were like the kindergartens of the sea. Fish laid their eggs in the mangroves, and the baby fish would hide in amongst the tree roots where larger predators couldn't reach them. The young small fish venture out of the safety of the mangroves into the nearby coral, where they are still somewhat protected, and they can rush back into the mangroves if needed. As the fish get larger and better able to take care of themselves, they journey off into deeper and more dangerous waters to feed.

The viewing at Alvaro's Point was extraordinary. We spent three hours snorkeling at this beautiful location. The water was crystal clear and the fish abundant. The fish came in all colors of the rainbow. There were parrot, trigger, angel and damsel fish everywhere.

"We saw tons of fish. We saw an upside-down jellyfish and a starfish as big as a tire." ~ Kim

continued on page 62



Fire coral. Photo by Christian Gernez



Fire coral and sponges. Photo by Christian Gernez



Moray eel



Angel fish



Arrow crab



Feather duster worm



Soft coral



Reef squid



Blue tang

Photos by Christian Gernez

Our snorkeling visits took us to an outer reef, an inner reef and a sponge garden. We rode through a banana canal looking for wildlife. We also had time to play on many magnificent beaches. One beach island was the home to the European "Survivor" TV show. This island beach had over thirty hawksbill sea turtle nests marked for safekeeping. Another beach was famous for having red poison arrow dart frogs and one was coffee black from the volcanoes. Squids, large fish, coral, and sponges were overwhelming in their beauty. Nature can paint a picture that is impossible for humans to recreate. Descriptions of the mini-ecosystem cannot begin to portray its complexity.

The Island of Bastimentos has no roads. The center was beautiful rain forest and it was surrounded by amazing beaches. It was a wonderful place for the residents of Salt Creek to show tourists their natural environment. The Ngöbe village of Salt Creek was in the heart of rainforest. To help their community survive, the village has developed an ecotourism plan. A nature trail was built to show off their island's natural wonders. The Jucuble (in Ngöbe) or Caiman Trail could bring hikers face to face with night monkeys, white-faced capuchins, armadillos, and three-toed sloths along

with red-throated ant tanagers, golden-colored manakins, three-wattled bellbirds, and green-breasted mango birds. A nearby lagoon was home to a small type of crocodile called a spectacled caimans. All along the trail, it was possible to see the poison dart frog that the island was famous for.

Our Ngöbe guide took us on a short walk through the amazing forest. He asked us to wait as he went ahead. One by one he brought us to a small tree. Out of the hollow, popped out the small heads of a family of night monkeys. These monkeys sleep during the day and are active searching for food at night. Their huge round eyes are sure sign that they are nocturnal.

Our farewell gift from Panama was having a calypso band, "the Beach Boys", play for us right in our lodge. Dancing with the Bocas Inn staff and laughing at our students who sat in with the band made for an unforgettable night. The Caribbean flavor of Bocas along with the beautiful corals was truly unforgettable.

Bocas was so different than the rest of Panama, but so were the Embera from the Ngöbe, as was one type of coral reef from another. The world is a wonderful place. You can try

to explore a country smaller than Wisconsin and never be able to see or understand all of its complexities. Our students have stories that will be told for a lifetime.

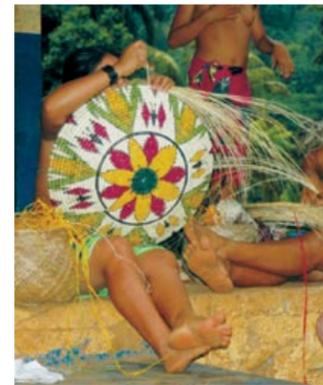
"I never thought it would be this hard to leave. I'm going to miss these people so much. This was the best thing I've ever done in my whole life. I know I am a different person now. This trip has definitely changed my life." ~ Jane

"The journey is almost over. We have overcome fears, obsessions, phobias, jungle snakes, spiders, bats, bugs, cold showers, no electricity, sunburns, no showering, dirty clothes, and so much more. The experience has surpassed all of our expectations. There are so many places in the world I want to see, but I would come back to Panama in a heartbeat. The country is so amazing and has so much history. You can't possibly take it all in in just two weeks. Thousands of memories are packed into a short amount of time. I don't want them to fade." ~ Kim

"It is good to realize that if love and peace can prevail on earth, and if we can teach our children to honor nature's gifts, the joys and beauties of the outdoors will be here forever." ~ President Jimmy Carter



Epiphytes



Embera basket



Tasting cocoa



Sloth



Tamarin



Forest vegetation

Middleton High School

MIDDLETON, WI

By Debra Weitzel, Biology Teacher

Our Costa Rica 2009 spring trip was great. The kids loved the “in the wild” feeling we got. I have talked much about fair trade, population, empowering women, microloans, anti-poverty, etc so this trip fit well with all that. The Tropical Center had lots of birds that we never saw on our last trip. Our guide was great as well.



A White faced monkey joined us at our breakfast site



Middleton high school students enjoy organic chocolate fondue



Middleton students choose baked items from LaGamba bakery



Middleton students learn about plants at the Guiyami reserve



Middleton students get beach time



One of our favorite spots



One of the giant trees in primary rainforest



Middleton students on a hike in the Corcovado National Park

Warren Township High School

GURNEE, IL



Students and fig tree (*Ficus padifolia*). Mexico 2005

By Roy Triveline

In 2003, I took a group of 12 to Panama. Although I have been to every country through Save the Rainforest, in many ways Panama was my favorite.

We stayed at the Rio Chagres Station and our guide throughout the whole trip was Christian. Panama is a beautiful country with extraordinary wildlife and charming people. Toucans, lizards, frogs, and capybaras were just a few of the animals we saw while hiking. The highlight of the trip for me was visiting the Embera Indians. Their barefoot guides lead us through some of the most remote parts of the forest. We climbed waterfalls, went spear fishing, and we learned a great deal about their culture. The tribe's shaman explained the many plant species that he used for curing his people and also showed us their traditional hunting methods.

The second part of the trip we stopped at the Panama Canal as we made our way to the coastline. We snorkeled in many different aquatic ecosystems and saw many species of fish dolphins, and sea stars.

Panama is a beautiful country and it was fantastic trip.



Student holding full grown pygmy opossum. Mexico 2005



Long shadows and blue footed booby. Galapagos



Student holding tarantula. Mexico 2005



Sunset atop education center at Palo Dulce. Mexico 2005

Bigfoot High School

WALWORTH, WI

By Barb Makovec, Biology Teacher

This summer I had the privilege of taking my fifth group on a Save the Rainforest tour. In the past I have travelled to Panama, Belize, Costa Rica, Ecuador and the Galapagos and now back to Panama. This has been a tremendous opportunity for me, my family (who have helped to chaperone) and certainly for my students! I am often asked to compare the different trip options: Which is my favorite? Which is the hardest? Which is the most fun? That is probably the most difficult aspect of the trips: deciding!

Nothing can beat the virgin rainforest and its complete massiveness of the Osa Peninsula of Costa Rica. Nothing can beat the snorkeling in the Western Reef of Belize or the beautiful ruins on the Belize mainland. Nothing can beat a river ride emerging at the Embera village or the engineering marvel of the Panama Canal. Certainly nothing can beat wlaiking in Darwin's footprints on the Galapagos Islands!

Which is my favorite? Which is the most fun? Which is the hardest? Those questions will be answered as my students grow up and take with them what they have learned. What is most memorable is knowing that a student returned three times to our village in Ecuador to work in the school. What is memorable is that a student used her experience with the children in Costa Rica to start a fundraising drive for third world countries. What is memorable is that following a trip, a group of students began our Environmental Awareness club.

Which is hardest? They all are! They are not meant to be easy! Learning never is but the satisfaction following the trips will stay with me and my students forever!



Ecuador, 2007



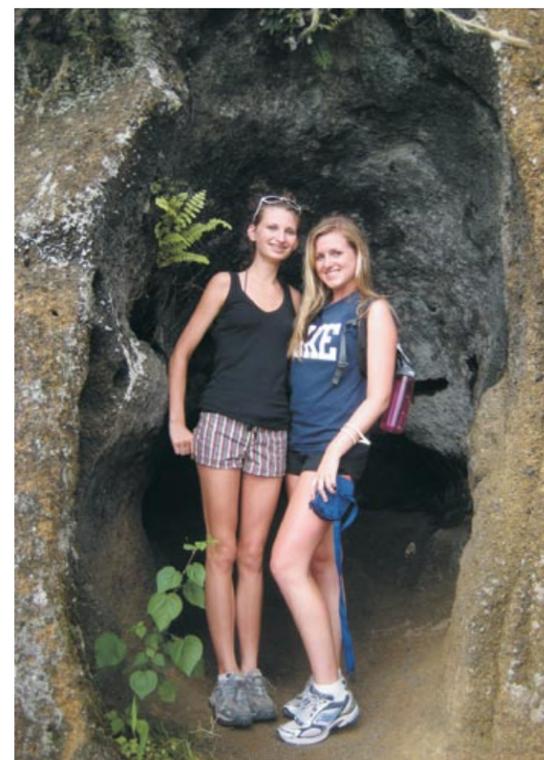
Panama, 2009

Cape Henry Collegiate School

VIRGINIA BEACH, VA

By Debra Duffy, Biology Teacher

The trip to the Galapagos was a once in a lifetime journey. It was enlightening for me to get to see the different habitats and climate zones of the island, journey to a volcano, and snorkel with sea lions. It was amazing to witness the students' awe and wonder and to observe the students out of a classroom setting. Each experience there taught me something new about others and myself. The trip showed each of us just why the environment should be preserved for future generations. ~ Marieke M. Vanderwerff, Sixth Grade Dean of Students, MS English Teacher



I had an amazing experience on the Galapagos trip. I experienced such a different lifestyle than I am used to. Spending so much time outside made me appreciate how beautiful nature was. Galapagos was such a neat, historic place to visit. It was amazing to experience a different culture than what I am used to in the United States. I even picked up on a few spanish phrases, which sparked my interest in learing more spanish! I've never visited a place so beautiful and natural as the Galapagos islands. I will never forget my incredible trip there ~ Jennifer Lee



My trip to the Galapagos Islands was an unforgettable experience. I have never been to a place where everything that I saw was so beautiful and breathtaking. Whether it was snorkeling in the crystal clear water or hiking in the mountains, everything that I came across I wanted to stop and stare because the Galapagos Islands are truly one of a kind. ~ Alex

Dodgeville High School

DODGEVILLE, WI



Kathy Warpinski, Spanish Teacher / Photos by Bill Boyer

Students fording mountain stream in rainforest

When I volunteered to interpret for the first American groups on the Save the Rainforest study tour to Ecuador in 1992 little did I realize how strongly our family's world view would be impacted. Here's what each of my three kids has to say about our various trips to Ecuador, Panama and Honduras. Alas, I when I traveled to Costa Rica in 2007, I took a student group from Dodgeville High School as my children were now grown and traveling on their own.

Lydia: Ecuador 1992, Panama 1993

Though I do remember the beauty of seeing brightly colored parrots soaring above the trees, spiders bigger than my hands, and iguana dinners, what stands out for me most, simply put, was the beauty of being completely and utterly in the moment my entire time in the rain forest. There were no cell phones, televisions, computers, nor electricity. There weren't even mirrors. We spent evenings playing cards by candle light and going to bed late meant asleep by nine. I took showers in downpours and washed my clothes in the river. Living so close to nature in this way made me alive in a way that I am not certain I have experienced since. What a gift

Daryl: Ecuador, 1998

Looking back on my time at Jatun Sacha the biological research station on the Rio Napo in Ecuador, 11 years ago, I have several lasting impressions.

I made the trip with Save the Rainforest shortly before I applied and entered medical school, and the exposure to unique cultures, both native and Ecuadorean, has shaped my outlook when dealing with many patients over the subsequent years.

The trip to the Amazon basin sharpened my values, including that we all share a single, small planet with limited resources. It was a unique experience that I continue to cherish.

Grace: Panama 1993, 2002; Honduras 1994; Ecuador, 1998

I am fortunate to be the daughter of a high school Spanish teacher. When I was growing up, my mother would interpret for American students who were participating in Bruce's early rainforest study programs. My siblings and I took turns tagging along on these trips. While most of his programs are around two weeks, my mom would sometimes stay on to interpret for another group, allowing me, or whichever sibling happened

to be accompanying her on that trip, the opportunity to spend a month or more camped out in the middle of a tropical rainforest.

After a four year break, my brother and I traveled to Ecuador with my mom in 1998 when I was in middle school. By this age, I had enough endurance to join the full hikes. I was amazed at what we saw. The sighting that stands out was the sloth 20 feet above us in a tree.

My final trip with STR was a return to Panama as a high school student. I went with the Biology teacher instead of my mother. Although familiar, the experience in Panama was much richer this time because I was older and paid attention to the beautiful history. For the second half of the Panama trip, we traveled to Bocas del Toro, a small island off the northern coast of the country. Our lodge was right on the water and as soon as we arrived, all ten of us ran and jumped off the second story porch into the water. We snorkeled, boated through mangroves, and even spotted dolphins Grace: Panama 1993, 2002; Honduras 1994; Ecuador, 1998

I am fortunate to be the daughter of a high school Spanish teacher. When I was growing up, my mother would interpret for American students who were participating in Bruce's early rainforest study programs. My siblings and I took turns tagging along on these trips. While most of his programs are around two weeks, my mom would sometimes stay on to interpret for another group, allowing me, or whichever sibling happened to be accompanying her on that trip, the opportunity to spend a month or more camped out in the middle of a tropical rainforest.

I was seven on my first trip to Panama in 1993. This was the first year that the ANCON lodge housing Save the Rainforest was finished and it was beautiful. Better yet for me, though, though, as a seven year old, were the exciting rides in the back of pick-up trucks that my mother would have never allowed me to do in the States. I quickly learned that the rainforest was very aptly named as it would pour everyday in the early afternoon. It was like clockwork. The downpours and carved out dirt trails made for some great plunges

On my second trip the following summer, I was still too young to endure most of the long daily the Honduran guides lead for our groups. Instead, I stayed back with the children of the cooks and visited the watering hole. This was also the summer that the night guards taught me to play the card game Rummy after the day's activities had concluded. As a seven year old I had a very limited Spanish skills. The little I did know was purely conversational at best. However, somehow I managed to learn the rules of Rummy completely in

continued on page 72



Seed table on organic farm, Costa Rica



Group hiking past bamboo on organic farm, Costa Rica



River in Osa Peninsula, Costa Rica



Group posing in front of the Tropical Youth Center on Osa Peninsula, Costa Rica



Fruit stand in downtown San Jose, Costa Rica



Member of Guyami Tribe demonstrating use of bow and arrow for hunting small game

Spanish. Now, as a Spanish teacher myself, I appreciate the power of immersion when studying languages.

Bruce Calhoun is a former biology teacher of Dodgeville High School. He has done a marvelous job creating a well-organized program that raises awareness about an ecosystem that must be protected.

Kathy: Ecuador, 1992,1998; Panama 1993; Honduras,1994; Ecuador, 1998; Costa Rica, 2007

The study tours to Ecuador were clearly the most rugged. First, we traveled the narrow route to the wintry pass in the Andes from Quito, before threading our way along rockslides with breathtaking drop offs along the unpaved mountain roads. Within eight hours we descended from the pass at 11,000 feet where the temperature was 30 degrees to a low altitude just a bit above sea level, where the weather was muggy and in the low 90's. Though clean and secure, our cabins were rustic, the trails steep and muddy, the commons open air with abundant tarantulas and the occasional bat. Highlights of the study tour were the hike to the Quichua village, the boat ride on the dramatic River Napo which is a main tributary of the Amazon, the school visit with the indigenous community and the long conversations with teachers and students from around the US.

As a Spanish teacher, what I took away from my Save the Rainforest study tours were primarily insights into the cultural contrasts.

People in the rainforest communities each of the countries I visited were highly skilled at doing more with less. In Costa Rica, the school kids learned to create art pieces out of recycled materials. One teacher showed students how to carefully cut open a pop can and cut the thin aluminum into a butterfly shape.

In all of the programs, the cooks, custodians, groundskeepers and other support staff were dedicated to their duties of their jobs but were eager to interact with students and teachers. While I listened to stories in Spanish which the workers would tell from time to time, our students would often get drawn into the experience, listening first, then venturing a few comments or questions.

Bilingual scientists at each nature center had their antenna up for examples of specimens that illustrated a point they were discussing, and could stop mid sentence to point out a two toed sloth moving along a tree branch, a trail of leaf cutter ants, or a tree snake devouring a live bird. I was in awe of the facility with which our guides moved between discussion in Spanish with a local expert, say, and English with our American students. In every case, school visits were popular with our students, who were keen on interacting with local kids. I would encourage simple questions and answers until the kids on both sides of the language spectrum felt more at ease talking with one another.

Local program instructors in Ecuador, particularly, underscored that a key element in saving the rainforest is the reduced consumerism of rich countries. Simply put, we must change our lifestyle: reduce, reuse and recycle. While these practices are not good for the U.S. economy, they are a boon to our overstressed Madre Tierra.



Gulfo Dulce. Osa Peninsula, Costa Rica



Crafts for sale, Costa Rica



Green Basilik (Jesus Christ Lizard), Osa Peninsula, Costa Rica

Sioux Central & Hartley-Melvin-Sanborn High Schools

NORTHWEST IOWA



Entire group in front of El Junco in the highlands of San Cristóbal

By Mary Steinbeck and Daina Powers

The world of travel is pure excitement, but there is nothing more gratifying than seeing through the eyes of students... young people who have never experienced life outside of the USA or even their home state. Nine Spanish students from these two school districts in Northwest Iowa were able to experience firsthand the language and culture of Ecuador and San Cristóbal in July, 2009.

Our small entourage arrived at the Quito airport where we were met by our guide team. After collecting our ton of luggage (we carried almost 100 extra pounds of school supplies) we were transported to a small hotel where we settled in and contacted parents to tell them about our safe arrival.

The next morning we boarded the bus and headed northwest toward the tropical cloudforest in the Andes. We hiked uphill for an hour to reach the biological station at Hesperia. After a delicious lunch of soup, rice, homegrown vegetables and fish



Getting ready to snorkel in the bay



Single file in cloudforest at La Hesperia

(all the food at Hesperia was awesome) we took our introductory hike into the rainforest.

Each day in the rainforest was not only exciting but also a learning experience. We learned the names of many indigenous plants and trees during our hikes and helped with Hesperia's reforestation project by planting fifty trees. We also planted peanuts and beans in the local garden, pressed sugar-cane into juice, made candy from freshly roasted peanuts and cocoa beans, and even milked cows by hand. The girls all had beautiful manicures from Darío's daughter one afternoon.

We met several volunteers from Germany, Spain, England, Finland, Japan, Australia and discovered the great need for volunteer work in such an area as La Hesperia which includes primary forest. In the evening we discussed agrobiodiversity and sustainable farming not just in Ecuador but its importance around the world. We learned about symbiosis and mutualism in the ecosystems of this diverse country.

One of the highlights was our day and a half in the Chilhuilpe community. We were so warmly welcomed by Henry and his family. We danced, weaved, had our own personal sauna and cleansing ceremony, threw hunting spears and received tatoos from the "mala" plant and ate chicken foot soup. We pressed and drank more sugar cane juice with lime and learned about healing plants and alternative medicines from the village shaman. There was a memorable ceremony where gifts and farewells were exchanged.

After another hike and a soccer game at Hesperia we hiked down the mountain for the last time and drove back to Quito where we shopped for souvenirs in the market and had our laundry done while we attended a service at a nearby Catholic church.

The following morning we flew to San Cristóbal, one of the oldest islands in the Galapagos, stopping in Guayaquil on the way. On San Cristóbal we got fitted for masks and snorkels before going to La Loberia where we saw the marine iguanas and sea lions for the first time. Then into the ocean for a view of underwater life. Most of the students adapted quickly even though it was their first snorkel ever. Later in the week we snorkeled three more times, each time at a different site and each time the sea lions found us, to our great delight.

continued on page 76



Cleansing ceremony in the river at dawn at Chilhuilpe



Climbing slippery hills in the cloudforest at Hesperia



The thrill of being young on a pristine beach on San Cristóbal



Qué rico el azúcar!

Our stay at the biological station in the highlands of the island was a bit more rustic than La Hesperia, but the teachers never heard a complaint from the group. There was an abundance of volunteers in July (more than seventy), so meals were in shifts and timing was everything for the bathrooms. Again, we hiked and planted more trees. We visited El Junco, the fresh water crater and finally were able to see the Galapagos turtles. We saw the famed blue footed boobies and actually were fortunate enough to see a male frigate bird showing his mating colors. A visit to the Island's Interpretive Center helped the students prepare for their presentations about the history and development of the islands and its species.

Back in Quito at our farewell dinner we all had the opportunity to express thoughts about the two weeks in Ecuador. We talked about the importance of being more careful with our resources and how to encourage this awareness in others. Each person shared ideas how to make their own ecological footprint smaller.



Planting "manzanillo trees" to encourage turtle migration on S.C.



We're experts in the art of reforestation by now!



Imagine, our first snorkeling experience is in the Galapagos!



Ready to work



HMS student weaving with Henry's sister at Chilluilpe village

Tropical Rainforests:

THE ROOT CAUSES FOR THEIR DECLINE, AND HOPE FOR THE FUTURE

by Bruce Calhoun

Neotropical Forests

In 1953, the year I was born, tropical forests covered much of Central and South America. They surrounded the banana and coffee plantations of Costa Rica, Honduras and Guatemala. They lined the banks of the Orinoco river which flowed through Venezuela into the Caribbean, and blanketed the foothills and valleys of Ecuador, Columbia, Peru and Bolivia. In northern Brazil an unbroken canopy of forest stretched a thousand miles from the mouth of the Amazon to its tributaries cascading down from the heights of the newly formed Andes (before the tectonic forces had raised up the Andes the Amazon had drained to the west, into the Pacific). Depending on regional climate and elevation these forests were dry and deciduous, or humid and evergreen.

The forests were inhabited by a star-studded cast of characters. Along the rivers and in the wetlands the strange looking tapir imitated life as a hippo, giant otters frolicked, and thirty foot anacondas hunted rodents as large as pigs. On the forest floor jaguars stalked clumsy looking anteaters, armadillos, peccaries and raccoon like coatimundis, while ignoring the brightly colored poison arrow dart frogs and other small members of its community. In the tree tops there were monkeys who had prehensile tails, squirrel-sized tamarins and marmosets, the deliberate and slow moving sloth, petal faced bats, vociferous macaws and mighty harpy eagles.

These animals were woven into an intricate ecology that had been evolving uninterrupted for millions of years. Over that time life had diversified to fill countless niches, most of which were in the tree canopy, where there was enough light for epiphytic plants to thrive. The creatures that fed on these plants ate their fruit or pollinated their flowers, adapted to life in the trees and left the shady forest floor sparsely populated.

continued on page 78

Studies done of the insects living in the canopy boggle the imagination. E.O. Wilson, a prominent naturalist, identified forty three different species of ants on a single tree in Peru. That equals the number of ant species found in the British Isles. An entomologist from the Smithsonian Institute, Terry Erwin, fogged trees in Panama with a biodegradable insecticide. He discovered twelve hundred species of beetle in one of his trees. Other insects such as walking sticks, preying mantis, katydids and butterflies also exhibited remarkable variety.

Paradoxically, the lush tropical forests that supported this array of fauna were rooted in a sterile soil. Over the eons its soils lost all their nutrients to leaching from the rains. It was only because a host of fungi and decomposing bacteria recycled the nutrients of the forest itself that it could exist. As rapidly as leaves and branches fell to the forest floor they decayed in the moist and warm environment, providing vegetation with the building blocks for growth.

This was something that the indigenous peoples, who inhabited the forest along with its animals, had known for generations. As a consequence they developed a subtle and masterful slash and burn system in which they always had garden plots in a different stage of growth. Each year during the dry season the men would clear and burn a small area of forest and plant a wide variety of seeds and tubers. During the first year the women would weed the garden assiduously, harvesting annual crops such as beans and maize. In the second year weeding was discontinued, and the shrubs and trees that would provide products later were pruned, while second year crops; plantains and avocado would be harvested. Over the next several years only a little trimming was done as the plot began to yield mangos, papaya, nuts, vanilla and chocolate. In the latter stages the plot resembled a secondary forest that provided habitat for wildlife and a cornucopia of medicines. Tribes in the Amazon had identified one thousand three hundred species of plants that could be used to treat ailments, many of which they would include in their cultivation system.

The European newcomers who came to the new world had little appreciation for the culture and wisdom of the native people, or for the forest. They were ill at ease in its alien world, and, up to my time, had contented themselves with nibbling away at its fringes. In the Amazon, especially, they were intimidated by a river that flooded its banks every rainy season, and had a volume of flow so great that you could paddle a canoe out its mouth one hundred miles into the Atlantic and still taste fresh water. Still, the diseases they brought

from the old world devastated all but the most isolated of tribes, and the ambitions they had for subduing the untidy jungle persisted in their hearts.

Old World Rainforests

The Congo Basin of Africa contained the second largest rainforest in the world. It was the size of the United States east of the Mississippi. The animals here were quite different from those in the Amazon, and the trees did not grow quite so high, or have as many epiphytes.

Living on the margins of the rainforest were Bantu speaking villagers, whose ancestors had belonged to the kingdoms of Kuba and Kongo, or to the even greater Lunda Empire. The Bantu grew manioc and cassava, and would often trade part of their crop for pygmy bush meat. They were the only contact pygmies had with the outside world, and they often took advantage of the primitive stone age people in their dealings.

There were many different ethnicities of pygmies, all of which were throw-backs to the time when man was a hunter gatherer and did not practice agriculture. A typical group of pygmies would consist of about thirty members of an extended family. They were nomadic, traveling the forest in constant search of food, and building temporary igloo like shelters out of palm thatch. The women would gather birds eggs, mushrooms, termites, caterpillars, berries, edible roots, grubs and just about anything else they could put in their mouths. The men would hunt monkeys, duikers (small antelope), giant forest hogs, aardvarks and the occasional forest elephant or gorilla. They were at one with the forest, as attuned to it as the leopard and chimpanzee.

Distinct from the Congo basin was the West African rainforest of the gold coast, and the rainforest of Madagascar, the fourth largest island in the world. Madagascar had been isolated from the rest of Africa for millions of years, and had a unique fauna and flora. Eighty percent of its species were endemic (found only in Madagascar), and it was famous for its lemurs, who had been driven to extinction by monkeys in other parts of the world.

Across the Indian Ocean from Madagascar the rainforests of mainland Asia sprawled. They contained the domesticated Indian elephant and water buffalo, gibbons, large eyed tarsiers, tigers, reticulated pythons and the slow loris. The tarsiers were small primates that had adapted to competition from monkeys by becoming nocturnal. The slow loris was a primate that survived the matriculation of monkeys by adopting the life style of new world sloths. The gibbons outdid the monkeys,

losing their tails, evolving long arms and short legs, and swinging from limb to limb as no other animal in the world could.

Gibbons were also found on the Indonesian archipelago, as were tigers and rhinoceroses. This archipelago, the largest in the world, consisted primarily of Sumatra, Java, Borneo, Sulawesi, Timor and New Guinea – with the Philippines laying just north of it. Borneo was home to the Orangutan. These great apes lived solitary lives and spent most of their time in the tree tops, where they were safer from clouded leopards.

Further east laid the imposing island of New Guinea. When Alfred Russell Wallace explored this island during his 1854-62 expedition he noted how its fauna differed from the more westerly islands. Most striking was the absence of monkeys. In their stead tree dwelling kangaroos prospered. They were not as agile as monkeys but they were evolving in that direction. He further noted that there were no tigers, no bearded pigs, no mouse deer, no placental animals of any sort. All the native mammals were marsupials. He divided New Guinea from the rest of the Indonesian archipelago with an imaginary line that is today called the Wallace Line. The faunal distribution to each side of this line turned out to be a consequence of falling sea levels during ice ages. When sea level dropped the Indonesian archipelago formed a land bridge with Asia, but this bridge did not link up with New Guinea because there was an ocean trench in between. New Guinea, however, did connect with Australia during the ice ages, and the opportunistic kangaroos hopped across the strip of low lying land and climbed awkwardly into the empty treetops of a new world.

The old world rainforests terminated in a sliver of habitat along the northeastern coast of Australia, thousands of miles distant from the Americas. They were as diverse, mysterious, three dimensional, and complex as the Neotropics. As we were to soon find out, they and the new world rainforests were also surprisingly fragile.

Rainforests In Trouble

The first Earth day in 1970 focused on cleaning up the United States and conserving its natural resources. To be sure this was very important. The rapid economic growth of the 50's and 60's had led to urban sprawl and widespread pollution. Smokestacks and automobile exhausts fouled the air, factories dumped toxic chemicals into our streams, runoff from farmers' fields clogged waterways with fertilizers and pesticides, solid waste piled up in unsanitary garbage dumps, and ground water became contaminated.

The country responded to the dilemma by passing legislation like the Clean Air and Water Act, and the Endangered Species Act. We also established the Environmental Protection Agency to oversee enforcement of these acts. In addition more national lands were designated as wildlife refuges, and an awareness campaign featuring Woodsy Owl's "Give a hoot, don't pollute" were funded. This campaign, like the 60's "Keep America Beautiful" advertisement with the Native American crying when he saw litter on the highway, was a resounding success.

What we ignored was the looming crisis of rainforest destruction. Slowly at first, then with startling acceleration in the 60's, tropical forests began to fall. Poverty and the exploding population of the third world was only partly to blame. Most of the deforestation was driven and financed by the loans and foreign aid of industrial nations. The World Bank was the main culprit. It was founded in 1944 by a coalition of countries on the premise that economically struggling nations needed loans so they could capitalize and become modern industrial states. "Peace and prosperity" was the motto of the World Bank, and it sounded good. In 1946 it loaned out millions of dollars to help rebuild Europe and Japan, and to prime the economies of the underdeveloped world.

The loans to Europe and Japan helped them to recover from World War II, and were promptly paid back. But as the 50's and 60's progressed the loans given out to third world countries did not always have the same beneficial impact. Part of the problem was that the World Bank would often give loans without being able to predict the rate of return or the full impact the loans would have on the countries they were given to. A lot of its dispersals were based on nothing other than optimistic guesswork and a belief in the infallibility of capitalism. Another problem was that the leaders of the countries on the receiving end of the loans were usually inept and/or corrupt. They eagerly accepted the windfall of loans only to mismanage the projects the loans were intended for, or to embezzle large portions of it to enrich themselves.

Thailand serves as an example of what began happening in the 50's. Thai Engineers from Bangkok backed by foreign funding traveled to the northern part of their country to design barrage dams that would replace the system that the local peoples had used for generations. This was called the muang faai system. It consisted of weirs that communities maintained along the course of their fast flowing rivers to control water levels so that they could irrigate their rice paddies. The communities

continued on page 80

cooperated to insure that everyone had enough water, and kept the weirs in working order through collective labor. They also imposed strict limitations on the logging in the upper regions of the watersheds where the headwaters originated.

The building of the dams not only destroyed the muang faai system, but it wrested stewardship of the forest from the locals. Bureaucrats in far away Bangkok illegally granted logging concessions to friends and family, and the forested hillsides that had protected the watersheds were demolished. Erosion and silting of the rivers ensued, rice farmers who had thrived under the old muang faai system abandoned their farms, and wildlife perished. Millions of dollars in loans and aid had resulted in massive habitat loss and a net reduction in rice production.

Throughout the Far East this sort of thing was happening. The Philippines were being despoiled of their natural resources by Ferdinand Marcos and his cronies. From 1968 to 1982 one hundred and fifty two billion dollars in loans financed the conversion of over a million acres of rainforest into agricultural land to grow export crops in Malaysia. The strong man of Indonesia, Suharto, used money from loans to line his pocket, build an army, and fund land clearing for palm oil plantations

In Sub Saharan Africa most of the countries had just emerged from colonial rule and were expecting bright futures. A skyrocketing population, tribal fragmentation, corrupt government leaders and bad loans were to frustrate their development. The country of Ghana, on the gold coast, became independent of Great Britain in 1957. It used loans to urbanize, transform rainforest into agricultural land, and build the artificial port of Tema to handle its increasing exports. The economy, however, could not keep up with a population that rose by nearly thirty percent in the sixties. Cote d'Ivoire, which gained independence in 1960 from France, Togo and other West African countries were having the same problem.

1960 was the year that the Congo became independent, too. There, Mobutu Sese Seko seized power in 1965, after five years of turmoil following the departure of the Belgians. Through economic ups and downs Mobutu attempted to transform his country into an industrial and military power, and enthrone himself as its perpetual ruler. With a four hundred and fifty million dollar loan from the U.S. Export and Import Bank he began the construction of the Inga dam, forty kilometers from the mouth of the Congo. The dam was intended to provide electricity for the copper mines of Katanga (renamed Shaba) that were one

thousand seven hundred kilometers away. Years later, after countless delays and the siphoning off of funds by Mobutu, the dam was finished. The amount of electricity sent to Shaba was one sixth of what was originally planned, and the cost had more than doubled. The rainforest and not suffered significant damage from this boon goggle, but the people of the Congo (Zaire as of 1971) had been saddled with an ominous debt.

In Central America loans sponsored a huge spurt of land clearing to provide pasture for raising cattle. Because the soil was unsuitable for grazing, large ranches were required to support the animals. These ranches were owned by the elite. In Nicaragua ninety percent of the improved land belonged to members of the dictator's Somoza family. Instead of growing food for its people Nicaragua was selling beef to the U.S. fast food market.

Costa Rica was hit the hardest by deforestation. In the 60's this prosperous and socially progressive country drank deep from the World Bank and other institutional cups. Its industrious peasants chain sawed forests as far as two thousand meters up the mountain sides. In the span of a decade twenty times more land was being grazed by cattle than being used to grow bananas. Aside from destroying habitat the cattle ranching was opening up the topography to severe erosion. In the tropics the rainforest acts as a sponge that absorbs tremendous amounts of water during the rainy season, thereby preventing flooding. In the dry season the forest releases the water downstream, supplying wildlife and people alike with freshwater during the hottest time of the year. With the removal of so much forest to raise cattle Costa Rica was degrading its watersheds and losing its soil - about two and a half tons for every kilogram of beef exported.

South America was another story. It could not export fresh beef to the U.S. because its cattle were subject to hoof and mouth disease. But in Brazil a tempest was brewing. With the backing of foreign aid and loans it was in the midst of executing plans to exploit the limitless resources of the Amazon. Central to these plans was development of the remote Carajas lode that had been surveyed for rich mineral deposits in 1967. Carajas was in the southwestern region of the Amazon and encompassed an area the size of Great Britain and France. Just one aspect of the project was the construction of twenty five pig iron smelters that would require fifty eight thousand square miles of forest for charcoal. It was a grandiose scheme. The disastrous consequences of its implementation would finally wake the world up to the specter of deforestation in the tropics.

Digging a Hole

"We welcome pollution", said a third world delegate at the environmental conference in Stockholm in 1972. "It is a sign of wealth."

This statement summed up the attitudes of many governments in the developing nations. They wanted to copy the life style of the West, to consume goods and produce waste with ever growing sophistication. The West was eager to encourage them. Third world countries with robust economies would be less likely to turn to communism. They would also provide a more lucrative market for the manufactured goods of the U.S, Europe and Japan.

The floodgates opened when OPEC drastically raised the price of crude oil in 1973 (in response to the U.S. printing excess currency, thereby devaluing the dollar). OPEC deposited the billions of dollars they received in Western banks, and these banks began loaning out their huge surplus of cash to third world countries at low rates of interest. Money from these commercial banks, and from multilateral institutions like the World Bank flowed in torrents to the poor countries, dwarfing the amounts that had been lent in the 60's.

Some of the loans were used by dictators to buy military hardware to suppress dissension or intimidate neighbors, some went to build transportation and communication infrastructure that actually benefited the third world. But most of the money was lavished on seductive super projects that promised exaggerated results. Funding these projects was much easier for the banks than the piecemeal funding of smaller and sounder projects that could have helped poor people at the grass roots level. With the single swoop of the pen hundreds of millions of dollars were designated for large scale construction projects that would prove of dubious value at best, and would cause untold social and environmental damage at worst.

In all over one trillion dollars was loaned out in the 1970's, most of the money going to fund the one thousand six hundred fourteen super projects that were undertaken. The cost of these projects averaged six hundred and twenty million dollars. Twenty five percent of these projects were related to oil exploitation, twenty percent to mining and another twenty five percent to building mega dams.

The Balbina dam in Brazil is an example of how poorly many of these projects were thought out and implemented. Its construction commenced in 1973 when the country was under the rule of a military junta. The junta was not concerned that two thousand

three hundred and sixty square kilometers of pristine rainforest would be flooded by the dam, or that many people would be displaced, including Waimiri-Atraari Indians. Nor did it bother the junta that the dam would only generate two hundred and fifty megawatts, as compared to its Turcuri dam that could produce thirty two times the wattage. To the junta Balbina meant progress, and its electricity meant cheap power for the foreign owned copper mines that supported their regime.

Construction fell behind schedule and went over budget. In 1986 the World Bank bailed it out with a five hundred million dollar loan, throwing good money after bad. Against growing protest, the Brazilian government completed the dam, flooding more forest than had been anticipated because terrain surveys had been conducted from the air and were not accurate. An immense reservoir formed, stranding everything from anteaters to jaguars on fifteen hundred little islands. These animals died a slow death, and the stench of their carcasses could be smelled for miles. Then the forest vegetation began to rot, depleting the oxygen in the water and producing hydrogen sulfide gas which turned the reservoir acidic. Fish died and the water was infested with slick scum that had a foul odor. People became sick with all sorts of intestinal disorders, and malaria carrying mosquitoes began to breed in the stagnant water. Downstream the shrimp and fishing industries were destroyed, and the rubber acai palm trees that were harvested for their luscious fruit died for lack of the silt the river had always provided. The forest had been devastated, and the lives of the local people ruined, but the government touted Balbina as a great achievement.

Under the Suharto dictatorship Indonesia was stretching its credit to the limit, also, as was Mobutu in Zaire, and the leaders of numerous other third world countries. The eagerness of the West to grant loans, and the inability of the recipient countries to make good use of those loans was digging a hole for the citizens of the developing nations. When the bill came due it would be sobering, and add momentum to deforestation in the tropics.

Eighty Days

For a brief moment, during the OPEC oil embargo of 1973, energy efficiency was popular in the United States. Small cars were in demand and alternative energy research was encouraged. But as soon as the crisis was over we reverted to the heavy use of fossil fuels. This was to lead to a large trade deficit, involvement in middle east conflicts, increased carbon dioxide levels in the atmosphere and aggressive exploitation of new reserves. *continued on page 82*

These reserves were found in places like Nigeria, Burma and Ecuador. Indeed, since 1964, Texaco had been exploring the rainforests of Ecuador for crude, drilling test wells in the Amazon. When oil was discovered, a pipeline was built from Guayaquil on the coast, across the Andes and down into the Amazon. Accompanying the pipeline was a road. The road allowed a flood of settlers from the crowded coastal plains and the Andes to invade two and a half million acres of pristine wilderness. Forests that could boast an astounding two hundred and forty tree species in a single hectare were slashed and burned so cash crops could be grown. But because the soils were so poor, the settlers were only able to harvest crops for a couple of seasons before land became unproductive. In a few short years an ecosystem brimming with exotic life had perished and been replaced with abandoned fields that were used to pasture malnourished cattle.

During that same period of time several indigenous peoples were adversely affected. They suffered as a direct result of cost saving measures carried out by Texaco. Ordinarily Texaco reinjected the waste water that came up with oil back into the empty wells. In Ecuador they were not required to perform this costly process (The Ecuadorian government received half its income from oil revenues, and was not concerned with regulations protecting the environment). Instead the toxic water was pumped into waste pits where it soaked into the ground and overflowed into the rivers during the rainy season. The Cofan, Secoya and Siona peoples began developing disorders from the carcinogens in the waste water. When they began complaining about not having clean water to bath in or drink, government officials gave them empty chemical barrels to catch rainwater in. They also told them that the pollution floated on the surface, and they could get clean water beneath the layer of filmy oil.

The toxic water, along with millions of gallons of spilled crude, made the Indians sick, but it killed the fish living in the Aguarica and Napo rivers that were a mainstay of the Indians' diet. This was a fatal blow to the tribes of the area. With no other alternative, they hunted the land animals to near extinction. Then many of them, with great reluctance, began to forsake their ancestral homes to live in poverty among the settlers.

Those who stayed on their traditional lands were as miserable as those who left. Spontaneous abortions occurred frequently, skin rashes and intestinal ailments were common, and incidents of cancer became widespread. To make things worse, Texaco spread sludge from its toxic pits on the local roads, ostensibly to keep dust down. This was really just another way for

them to dispose of the two million gallons of waste they produced every day. It had the effect of distributing toxic chemicals more universally, and obliged the barefooted Indians to walk on a tarry substance every time they used the road. The only way they could clean their feet afterwards was to use gas soaked rags, generously provided by the government.

From 1971 to 1992 this went on. In total, Texaco polluted the Ecuadorian Amazon with seventeen million gallons of crude oil (almost twice the amount of oil spilled by the Exxon Valdez in Alaska) and twenty billion gallons of toxic waste water. The cost in human degradation, in habitat loss, in extinction of species, was staggering. It was a profitable venture, though. A billion barrels of oil had been extracted, enough to meet America's energy needs for eighty days, the time it took H.G. Well's hero to circle the globe in the nineteenth century, before the advent of the gas driven internal combustion machine.

Fiasco In Indonesia

The heavy use of pesticides to increase yields of rice in Indonesia began in the 1960s. Fifteen years later, an ongoing study showed that the pesticides, though expensive, had not had any impact. It found that for every pest species killed, five non pest species were killed, some of which were pest predators. Over three thousand years of evolution, rice paddies had established a natural balance between predators and prey.

Unfortunately, the pesticides threw this balance off kilter. One of the pests, the brown plant hopper, had developed an immunity to pesticides. In 1976 its population boomed, consuming half a million hectares of rice - enough rice to feed three million people for an entire year. The application of pesticides was discontinued.

Three years later another disaster occurred. The World Bank approved its first transmigration loan to Indonesia. Transmigration was not something new to the county. It had been going on at a modest pace since 1903, and was based on the quite reasonable premise that the redistribution of Indonesia's population, concentrated on the island of Java, would have desirable effects. Like the homesteading of the American West, transmigration was intended to give impoverished people a chance to settle a sparsely inhabited frontier and become productive farmers.

Under the corrupt and repressive Suharto regime, however, transmigration became a tool of tyranny, and the World Bank's loans, a means to fund its expansion.

With the five hundred and sixty million dollars loaned by the Bank, and additional funding from The World Food Program, Germany, Britain and the Dutch, three and a half million people were resettled in ten years.

Most of these people were unwilling Javanese peasants, who had become landless as the disparity between the rich and poor was widened under Suharto's iron fisted rule. They were rooted up from their communities and sent to strange islands at the cost of seven hundred dollars per family. Suharto had them sent to Sumatra, Borneo, Irian Jaya (which he had annexed), Sulawesi and East Timor (which he had invaded) - areas of unrest, where local people were seeking more autonomy from his highly centralized and unrepresentative government. This, along with using his army to intimidate opposition, was the way in which he conducted an internal colonization of his country, and diluted its troublesome pluralism.

The resulting environmental damage was extensive. Forests were indiscriminately cleared to establish farms and tree plantations in violation of the World Bank's own guidelines, which the Bank proved unwilling or unable to enforce. Hillside grades of eight percent and more, were bulldozed, leading to severe erosion and the silting of waterways in the rainy season. Valuable hardwood trees, that could have been harvested in the process of clearing, were simply burned to ash. Fields that were planted with crops failed to produce worthwhile yields, and were abandoned. One of the great natural storehouses of biological diversity, ten percent of the world's remaining rainforests, was being decimated.

So too were the cultures of tribal peoples like the Dayak of Borneo and the Kuba Rimba of Sumatra. When the World Bank T2 project transplanted thirty thousand families into the Kuba's traditional territories in 1979, the Kuba protested. They said the forests settlers were clearing what was theirs. But the nomadic Kuba, because they practiced shifting agriculture instead of fixed dry crop or irrigation cultivation, did not qualify for land entitlement under Indonesian law. With the acquiescence of the World Bank, whose stated policy was to respect Indigenous rights, their forest was subdivided into farms of five hectares each, and the homeless Kuba were reduced to begging at bus stops. This kind of systematic dispossession of native people occurred throughout the outer islands of Indonesia.

By 1991 deforestation rates in Indonesia reached one point two million hectares per year, and the World Bank had ceased funding transmigration because of the overwhelmingly detrimental effect it was having

on tribal groups, and the failure of settlers to establish prosperous communities. In the end the program had depleted the natural resources of Indonesia, spread poverty to the outer islands, and strengthened a dictatorship. Furthermore, it had failed to measurably lower the population of Java, which was its original purpose, and contributed to a foreign debt that was to reach a colossal one hundred and thirty two billion dollars by the turn of the century.

The Bill Comes Due

In the 1980's, as interest rates starting going up, third world countries teetered on the edge of bankruptcy because of the extravagant loans that had been made in the 70's. A sister institution of the World Bank, the International Monetary Fund (IMF), began to play a major role in this trillion dollar crisis. The IMF drew up Structural Adjustment Plans (SAPS) for countries in economic trouble that were designed to keep these countries solvent. If a country agreed to implement the plan the IMF would give it the stamp of approval, making it eligible to receive further loans and aid, and maintaining the viability of its currency.

The structural plans called for a tightening of the belt in the third world. Countries that had miniscule budgets for health care and education in the first place, were forced to cut funding for these programs by as much as half. Spending on public transportation, environmental protection, sanitation projects and community services was all but suspended. Exports of raw materials was increased, wages were dropped.

The West African country of Ghana agreed to IMF plans in 1983. In addition to cutting expenditures on government services they relaxed mining regulations and reduced tariffs. Multinational mining companies flocked to Ghana to extract its diamonds, gold and bauxite. They opened up the earth with great surface mines, destroying sixty percent of the Wassu West district and polluting water with the cyanide they used to process gold deposits. To help Ghana complete the irreversible consumption of its natural resources the Canadian International Aide Agency supplied it with extensive, state of the art forestry equipment. Ebony, mahogany, and lesser known tree species were sawed down and exported to generate the hard cash that Ghana had to pay its debt with. Two percent of its forests fell every year.

In nearby Ivory Coast the SAPS came a few years later. The country's currency was devalued and its export tax eliminated. This led to a boom in the farming of Cocoa. Incentives for planting new groves were so great that

continued on page 84

the country's protected rainforests were slashed and burned in a pell-mell race to cash in on the crop. Ivory Coast became the biggest exporter of cocoa in the world, but it was losing the forests that helped create a favorable mini-climate for the cocoa, and it was still unable to pay off the principal on its loans.

All over the third world the same kind of thing was happening. The environment and the underprivileged were paying for the mistakes and misdeeds of developing country leaders, and the flawed lending policy of the West. The poor were getting poorer, and the resources of their countries were being sold off at an unsustainable rate. The Philippines had already demonstrated that overexploitation of resources was bad economics. Under Marcos, it had aggressively stripped its islands bare of forest and minerals for thirty years, and been heralded as a super achiever. But by the 80's it had squandered its wealth. The GNP of the Philippines dropped like a stone, and it had to start borrowing money to import the raw materials it had so recently exported.

Notwithstanding, the formula for dealing with the crushing indebtedness of the third world remained the same: Impose austerity programs on the poor, and promote the export of cash crops and natural resources from tropical zones. Now, loans were not only subsidizing projects that did harm to rainforests, the repayment of them was being used as a rationale for utterly destroying them.

From Outer Space

Exhaustive studies carried out by the Missouri Botanical Gardens, New York Botanical Gardens and the Yale school of forestry in the 80's showed that the sustainable harvest of non timber products in tropical rainforests yielded twice as much profit as harvesting its trees or converting it to cattle ranches. It was calculated that six thousand three hundred and thirty dollars worth of rubber, nuts, fruit, gums, fibers, resins, dyes, waxes and natural oils could be collected annually per hectare.

Tropical rainforests were also proving to be of pharmaceutical value. Digitalis, used in treating heart failure, hydrocortisone, and the cure for leukemia, vincristine, were all derived from rainforest plants. Furthermore, scientists had come to understand that tropical forests helped to purify the Earth's atmosphere, and served as carbon sinks. Through photosynthesis they absorbed large amounts of carbon dioxide from the air and converted it to wood tissue. This had a mitigating effect on the greenhouse gases the industrialized nations were spewing into the skies.

Such considerations were lost on the Brazilian government when it launched an undertaking of unprecedented magnitude, the Greater Carajas Project, in 1982. In addition to constructing twenty five pig iron smelters, sixty two billion dollars was to be spent on mines, railroads, dams, and a road that gave public access to the remote southwest corner of the Amazon. The now infamous road, Hwy BR-364, brought in half a million landless peasants who went busily to work slashing and burning forests. They established farms and planted crops that only grew for one or two seasons because the soil was ill suited for agriculture. Then they moved on to clear more land in a fruitless cycle of destruction. The peasants were followed by fifty thousand cattle ranchers who grazed their cattle on the meager grasses of the abandoned farms. They established sixty thousand acre ranches, and received a billion dollars in subsidies to prop up their operations.

The road and its users were opposed by the inhabitants of Rondonia, who had been living contentedly in their vast forest wilderness. They consisted of indigenous peoples and the families of rubber tappers who dwelled in scattered settlements along tributaries of the Amazon River. The plundering of the forest by the newcomers made no sense to them. Clearing land to grow crops was hard, unrewarding work, and opened the land up to erosion. It also deprived people of the bountiful harvest of rubber and other products that the forest had to offer. Disbelief turned to anger and protest as the encroachment continued, devastating millions of acres of rainforest. There were meetings and petitions, law suits and demonstrations. The government and vested interests countered with violence. They sent in thugs to beat up organizers and cowl the population. When this did empty chemical barrels to catch rainwater in. They also told not work they began a reign of terror and assassination that culminated in the brutal shooting of Chico Mendes, an articulate and well known spokesperson for the rubber tappers union, on the porch of his home.

This pivotal act occurred in 1988, the same year that satellite pictures revealed eight thousand fires burning in the Carajas zone of the Amazon. Distant photographs of Earth from the Apollo missions had made humanity realize that our planet was an island oasis in space, images captured from an orbiting craft of the Amazon ablaze showed us that oasis was imperiled. The plight of the rainforests, and the people who were trying to protect them, suddenly became front page news.

Hope for the Future

Ever since the plight of tropical rainforests became widely known in the late 1980s environmentalists and concerned citizens have been trying to save them from destruction. School children have raised millions of dollars to purchase rainforest and establish "International Children's Rainforests" in Central and South America. The Nature Conservancy and other large conservation organizations have crafted and implemented sophisticated "Debt for Nature Swaps." Ecotourism programs that offer employment to people living near rainforests have proliferated. Sustainable forestry projects that are certified by watchdog organizations like The Rainforest Alliance, according to the Forest Stewardship Council, have increased tenfold. Still, tropical forests continue to disappear at a breathtaking rate. The United Nations Food and Agriculture Organization (FAO) reported that the deforestation rate in the tropics averaged 10.4 million hectares during the period 2000-2005. This is an increase over the deforestation rate in the tropics during the 1990s, which was 9.4 million hectares per year according to FAO's 2000 Global Forest Resource Assessment.

The forces that are driving this increase in deforestation rates are related to the economic development taking place in the tropics. Immediate drivers include wood harvesting, agricultural expansion and road building. Underlying these drivers are poverty, ignorance, population growth, international trade policies, political instability and government corruption. To save the rainforest these drivers must be reconciled with forest stewardship. The best way to do this, contends a newly formed alliance of tropical countries called the Coalition for Rainforest Nations, is to compensate developing countries for protecting their forests. They are proposing that this be done through an initiative called REDD, and they were successful in getting REDD on the agenda of the climate change agreement that will be ratified in Copenhagen in December 2009. This agreement will set the greenhouse emission goals and policies for the Kyoto Protocol commitment period of 2013-17.

REDD stands for Reducing Emissions from Deforestation and forest Degradation in Developing countries. It is being considered by climate change negotiators because it has become evident that something needs to be done to reduce emissions related to deforestation. Every time a hectare of tropical forest is destroyed most of the 120-400 tons of carbon it sequesters (Frangi & Lugo 1985, Rai & Proctor 1986, Brown & Lugo 1992, Fernside 2000, Nascimento & Laurance 2002) is released into the atmosphere. Studies

conducted by the International Panel on Climate Change and the United States Energy Department have determined that approximately 20% of all greenhouse gas emissions are related to deforestation. Three other studies indicate that 25% of anthropogenic carbon emissions in the 1980s and 1990s came from deforestation in the tropics (with estimates ranging from 1.9 to 3 billion tons a year; Fearnside 2000, Malhi & Grace 2000, Houghton 2003). Either of these figures establishes that emissions from deforestation exceeds emissions from the worlds largest polluter, China.

The REDD initiative is based on the premise that, in order to slow deforestation in the tropics and reconcile forest stewardship with economic development, forests must be valued for the ecosystem services they provide, particularly the ecosystem service of carbon sequestration. If they are so valued, and developing countries are compensated for protecting forests, cutting down trees in the tropics will be disincentivised. A standing forest will be worth more than a soybean farm, a palm oil plantation or a logging concession. How much more? Here's an example: The Ngoyla-Mintom Forest in Cameroon is 830,000 hectares in extent. It shelters forest elephants, low-land gorillas, chimpanzees and the highly endangered mandrill---literally the most colorful of all mammals. If Cameroon protected the forest it could receive 64 million dollars over 30 years under REDD. This is based on Cameroon being paid \$3 for every ton of carbon it sequesters, a determination that each hectare of forest contains 160 tons of carbon, an estimate that the deforestation rate would be 8,300 hectares per year if Cameroon did not protect the forest, and a 5% discount rate. A logging company is offering 26 million dollars for a logging concession in Ngoyla. For Cameroon, preserving Ngoyla-Mintom through REDD would be a sound economic decision. The forest reserve would be worth 38 million dollars more if it was protected.

But how would REDD work on a larger scale, at the national level. First, it would require the participation of all the tropical forest countries. Otherwise, activities like logging and clearing land for plantations would "leak" into the countries not participating, and cause deforestation rates to soar in the nonsignatory countries. Second, it would require a method to monitor and verify that a reduction in deforestation rates is actually occurring in tropical countries. Fortunately, new satellites capable of high resolution distant imaging can now monitor forest cover very accurately and comprehensively. If satellite images verified that a country, Indonesia for example, had reduced its deforestation rate by .5 million hectares/

continued on page 86

year, Indonesia could receive 240 million dollars a year under REDD (.5 million hectares saved/year x 160 tons carbon/hectare x \$3/per carbon ton). Third, all the forest stakeholders in a country like Indonesia would have to be included in the implementation of REDD, and receive compensation for the role they play in reducing deforestation rates. This means that the 240 million dollars being received by Indonesia every year would have to be fairly distributed between Indigenous people, rural communities that border forests, non-profit organizations that manage and protect reserves, government agencies that are tasked with protecting National Parks from illegal logging and poaching, and forest industries.

Preparing REDD to meet the criteria above will not be easy or cheap. Pilot REDD programs are already being undertaken in an effort to pave the way for a global effort should REDD be adopted in Copenhagen. The estimated cost of these programs is 4-5 billion dollars. In May of 2008 Germany pledged to raise 500 million dollars a year for this process by auctioning off emission permits. In June of 2008 Great Britain and Norway promised 200 million dollars for a Congo Basin Forest Fund. In August of 2008 Norway pledged another 1 billion through 2015 to a forest fund for Brazil, and in March 2009 Norway announced it would pay out a further 400 million dollars a year to jumpstart REDD. Many of these funds are being channeled through the World Bank's Global Carbon Partnership Facility and the United Nations' REDD program. Current pilot programs include:

1. The Aceh Ulu Mason project in Indonesia. This project is protecting 750,000 hectares of forest. It is being funded through voluntary carbon markets and will receive 26 million dollars over 5 years. It will prevent 100 million tons of carbon from going into the atmosphere over the next 30 years, and it is already lifting the people living in the vicinity out of abject poverty by funding sustainable development in the reserve's buffer zone. It is also financing health and educational projects in local communities.
2. Juma Sustainable Development Reserve in Brazil. This project is protecting 366,150 hectares in the Amazonas Province. Protecting this forest will prevent 210 million tons of carbon emissions through the year 2050. The Amazonas government has officially stated that it considers REDD the only possible mechanism for protecting the region's forests from economic pressures.
3. Noel Kempff Mercado Climate Action Project in Bolivia. This project is protecting 1.5 million

hectares of Amazonian rainforest, gallery forest, semi-deciduous tropical forest, flooded savannah and dry cerrado---5 distinct and important ecosystems. At present, this is the largest carbon offset REDD program in the world. It has received 11 million dollars from various sources, including industry contributors PacificCorp, British Petroleum and American Electric Power.

Other pilot projects are in the planning stages. In addition, capacity building in tropical nations is underway. Symposiums on benefit sharing among forest stakeholders, workshops on monitoring deforestation with satellite imagery and REDD policy meetings are taking place throughout the tropics as the countdown to Copenhagen continues. It is by no means assured that, after all of this, REDD will be adopted as a provision in the climate change agreement. That is the reason why people, especially teachers and their students, should be aware of REDD. Without their support REDD may be sidetracked into the realm of what might have been. Why? Because REDD will be expensive. Sir Nicholas Stern, a prominent British climate change expert, calculates the annual cost of compensating tropical countries for protecting their forests will be 10-15 billion a year---if we want them to reduce their deforestation rates by 50%. This is money that many of the industrialized countries may prefer to invest in energy efficiency and renewable energy at home. Although renewable energy technology and energy efficiency are good investments, they should not be our only investments. These investments will not immediately reduce our emissions. On the other hand, reducing emissions from deforestation requires no new technology and can reap huge dividends the minute we incentivise tropical forest conservation. Most governments and their climate change negotiators are aware of this, but the weight of public opinion may be what it takes assure that REDD is adopted. Indeed, proposals similar to REDD were rejected by climate change negotiators in the agreement that set goals and policies for the period of 2008-12. Lack of public awareness and support, as well as other concerns* were responsible for this.

If REDD is adopted by the United Nations Framework Convention on Climate Change in Copenhagen in December 2009, it will go into effect in 2012. From December 2009 through 2011 will be a transition period through which the above mentioned building capacity going on in developing countries will be accelerated. There will certainly be challenges posed by corruption and instability in many of the developing countries. A case in point is what happened in Madagascar this past March. When the president of the

country was driven from office, chaos followed. Gangs of thugs invaded Marojejy National Park and started cutting down valuable rosewood trees, endangering the survival of the rare silky sifaka, a lemur that is endemic to Marojejy. One way to prevent this kind of tragedy in the future, and to prevent illegal logging in general, will be to barcode trees in the tropics so illegal logs can not enter into major markets. Helveta, a British Company, is already barcoding trees in the African country of Liberia, and their timber tracking system looks promising.

Setbacks and challenges aside, REDD, if adopted, promises not only climate change mitigation, but a halt to the loss of biodiversity that is occurring in the tropics. Right now, even as we are losing rainforests at a terrible rate, researchers are discovering an astounding number of new species ahead of the chainsaw and bulldozer. According to the International Institute for Species Exploration and the International Commission on Zoological Nomenclature, 16,969 new species were catalogued in 2006 . A pygmy sloth in Panama, the white titi monkey in Brazil, and even a snake from Borneo that changes color like a chamaleon are among new discoveries. Most recently, an expedition to a

remote region of Papua New Guinea netted 56 new species, including 3 new species of frogs---the number of amphibian species that have been identified has increased by 25% over the last 10 years.

REDD also has the potential to lift tens of millions of people out of poverty and to provide the impetus for protecting the quality of their physical environment, especially the quality of their fresh water supply---which depends on healthy, forested watersheds. A World Bank official, Kenneth Chomitz, estimates there are 800 million people living in rural areas in the tropics. Many of them live in and around tropical forests. They represent the largest segment of forest stakeholders that stands to benefit from the flow of carbon market monies into the tropics. Just as the impoverished people living around Aceh Ulu Mason Reserve in Indonesia are seeing their standard of living rise because of the REDD pilot program, so too will many others if REDD is adopted. That's a big "if", however, and it may all come down to whether or not enough citizens of our planet tell the world's governments to adopt REDD as part of the new climate change agreement in December 2009.





Bruce Calhoun founded Save the Rainforest, Inc. in 1988 while teaching biology at Dodgeville High School. Prior to founding STR Bruce taught marine biology in Puerto Rico, volunteered as a research diver for the Australian Institute of Marine Science and worked as a naturalist for the Wisconsin Department of Natural Resources.



www.saverfn.org