

Before You Go

Outline of the Rainforest Reforestation Project

Asociación Para la Conservación y Manejo de las Áreas Forestales

(Forest Conservation and Management Association)

Costa Rica claims to have protected a greater percentage of its native forest (more than 20%) than any other country in the world. Environmental protection laws there are far more concerned about the future than those in most countries. However, despite the laws, the rate of reforestation in Costa Rica is high (2.3% or 200 square miles per year) and most protected areas are logged illegally. The untouched forests are threatened as long as the human population continues to soar due to the wealth of resources in forests that people exploit. Local people and industries draw on the forests for wood, fruit, nuts, soil or just more room. Cattle ranches are particularly harmful to tropical rainforests across the globe because of their sheer size and number. Large expanses of rainforest are slashed and burned to make room for cattle grazing pastures. Many tropical biologists believe that reduced patches of rainforest may not be able to increase in size by themselves. Because the species diversity within tropical rainforests is so high, individuals of any one species are generally dispersed over a great area. Each male jaguar, for instance, covers a territory of around 100 square miles. Therefore, within a small parcel of rainforest, there may not be enough individuals of a given species to continue the population. Each species in any ecosystem is dependent on another in some way, whether it is for nutrients, protection, water, proximity to the sun, etc. In the rainforest, the relationship between species is as complex as any habitat on earth. Exterminating one link in this interaction can have disastrous indirect effects.

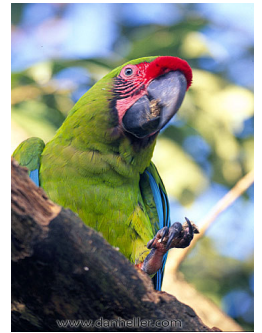
The northern Caribbean plain of Costa Rica was once the biggest tract of lowland rainforest in the country. Now less than 10% is covered by pristine forest. The area was once home to a healthy population of great green macaws (*Ara ambigua*), now there are only 25 to 35 breeding pairs left in Costa Rica and the bird is classified as Appendix I by CITES. In 1998, in response to this critical situation, five rural communities around Pital united to form ASCOMAFOR: Asociación Para la Conservación y Manejo de las Áreas Forestales (Forest Conservation and Management Association). This organization is comprised of several community groups that seek greater support from the government, ecotourist groups and local people for reforestation and rural community improvement. This leg of the EcoTeach tour will allow the student group to participate in a hands-on reforestation project managed and performed by cooperating local communities. Through personal contact with the people of the area, you get an insider's look at their work, their homes and their future.

The road to Pital divides coffee plantations in the mountains and bananas on the sprawling coastal plain. A blue haze from the muggy Caribbean Sea blankets a vast stretch of farms and isolated tracts of forest. The rivers that lace this area drain into the Rio San Juan dividing Costa Rica and Nicaragua. South of Pital are Parques Nacionales Juan Castro Blanco, Volcan Poás and Braulio Carillo. There are no protected lands between Pital and the Nicaraguan border. Currently, the government owns and manages this land, but largely neglects it. The people around Pital seek legal guardianship and financial support from the government to protect the remaining forests and re-establish new ones.

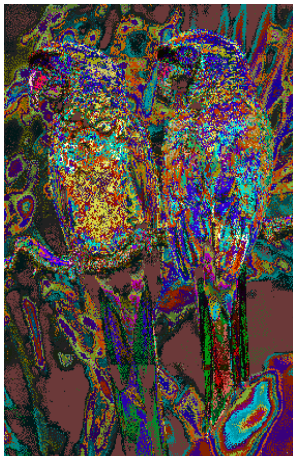
Background Information about Macaws

Only 25 to 35 breeding pairs of great green macaws remain in Costa Rica. Their populations have been seriously diminished as a result of habitat loss and capture for trade. Macaws - of the genus *Ara* - belong to the family Psittacidae, which includes parrots, parakeets and parrotlets. Members of the Psittacidae family feed primarily on immature nuts and seeds, but also gather leaf and flower buds, fruit and nectar from a large variety of trees. While in Costa Rica, you are sure to hear the clattering screeches, gargles and squawks of these boisterous birds. Parrots, parakeets and parrotlets are mainly green with a variety of colors on the head, neck and wings. They range in length from 3" (8cm) to 15" (38cm) and travel in noisy flocks of up to 50 birds.

Macaws are generally much more colorful with feathers of bright and contrasting yellows, blues, reds and greens. They have evolved multi-functional bills built to devour anything they find. According to *Birds of Costa Rica*, the bill "combines the destructive powers of an ice pick (the sharp-pointed upper mandible), a chisel (the sharp-edged lower mandible), a file (ridged inner surface of the upper mandible), and a vice. The clamping power of a macaw beak can easily fold a thick metal button in half. These birds also have very dexterous zygodactyl toes (two toes facing forwards and two facing backwards), which they use to grab and maneuver fruit between their jaws and cling to branches, even hanging upside down. Macaws are also much larger and have longer tails and tend to fly in pairs or with a young. Only two of the seven species of macaws are found in Costa Rica, the scarlet (*Ara macao*) and the great green (*Ara ambigu*).



Macaws' zygodactyl feet afford them great dexterity while feeding



A pair of Great Green macaws

The great green macaw, as the name suggests, is outstanding in that its body is almost totally green. Only the tail and lore (see "Key Terminology") are seen emblazoned in red while perched and blue on the wings while in flight. The fruit and seeds of the almendro tree (yellow almond - *Dipteryx panamensis*) and *Sacoglottis trichogyna* form the basis of the green macaw diet, although it has been observed feeding from up to 34 other tree species when these other two types are not fruiting. The almendro is also its favorite nesting tree. While the great green macaw is primarily a lowland bird, it tends to migrate up to 1000 meters elevation as food from *Dipteryx* and *Sacoglottis* fruit becomes scarce. The bird does not reach breeding age until about five or six years, but remains sexually productive until nearly 30. In Costa Rica, the great green macaw nests in December and January and the incubation period lasts about three months.

Psittacidae are known for their intelligence, mostly because of their curiosity and ability to use varied vocal communication. As pets, they are clever, mischievous and obnoxiously loud. They can be taught the pronunciation and meaning of many words, but they cannot be taught to avoid shiny objects. Since they are so curious and naturally feed from such a wide variety of plants, they are known to try to eat anything that even vaguely resembles a seed. Macaw owners who have left their clothes unattended to dry on the line have returned to discover a pile of buttons broken in half on the ground. Because they are naturally monogamous, single birds often become very attached to their owners. This fact can have a disastrous negative effect, as macaws that are well cared for may outlive their owners. When macaw owners die, the birds have been known to go into a period of grief during which they pull out their own feathers. Nonetheless, they are highly sought as pets because they are so brightly colored and represent the ideal "tropical" bird.



Threats and Conservation

Macaws are so brightly colored that many people cannot believe how they survive, as they must be very obvious to predators. However, because of their large size, there simply are not that many predators big enough to take on such a large bird armed with such a formidable beak. Only eagles and medium and large cats are big enough to contend with macaws. Indigenous people eat them to a limited extent, but the meat is said to be tough and stringy. Primarily, they are desired for their radiant feathers, which are used to decorate jewelry and headdresses.

As with the majority of endangered species, it is not indigenous use that has driven the species to the brink of extinction, it is habitat destruction and overexploitation. About 25 to 35 great green macaw (CITES Appendix I) pairs live in Costa Rica, confined to the remaining rainforests of the north-east region, bordered by Rios San Juan River, Sarapiquí and San Carlos and composing of about 438 square miles (1,120 sq km). Just a handful of these birds venture into the Pital area, primarily to feed on the almendro when the tree is in fruiting season. Many macaws are shot for food, sport or their boldly colored feathers. One of the major threats to macaw survival is capture for pet trade. In many forests throughout tropical America, poachers trap adults and cut down nest trees to catch fledglings. Obviously, this practice is particularly damaging to the wild population because the bird does not get a chance to reproduce. Some fledglings are sold on black markets for about \$150-\$300 within the country or are drugged, hidden in suitcases and smuggled to North America and Europe. All macaws are endangered as a result and their trade is strictly controlled by CITES. However, since they are so rare and illegal and demand remains high, they are worth thousands of dollars on the foreign black market, a great incentive for inconsiderate poachers. Several biological factors combine to put these birds at greater risk. They are long-lived animals (up to 40 years in the wild and 70 years in captivity) and do not reach sexual maturity for several years. They are monogamous and only mate every two to three years. If one member of a breeding pair is captured, the stranded partner may not be able to find a replacement mate. Macaws usually lay only two eggs and, as is true with many birds, favor the one that has a greater chance of survival (the larger one) by feeding it more. In other words, if a macaw chick is taken from the nest, that breeding pair will not contribute to the local population for several years.



Historic breeding range of Great Green Macaws in Costa Rica (based upon anecdotal evidence) has been reduced by 90% to the current breeding range. (Taken from Powell *et al.*, 1999)



Former distribution of great green macaw. This area has now been reduced to small fragmentary populations in Nicaragua, Costa Rica, Panama, W. Colombia and W. Ecuador.

Like the majority of endangered animals, macaws also face serious pressure due to habitat loss. Powell *et al.*¹ estimate that the great green macaw breeding habitat in Costa Rica has been reduced by 90% in the last eight years and that loggers focus on the *Dipteryx* and *Sacoglottis* species for their hard wood. Macaws nest in tree cavities and are very selective when choosing a nesting location. The heartwood of many trees is dead and, in many rainforest individuals, is carved out by insects such as termites and wood boring beetles. A woodpecker may make a hole in the outer shell of the tree by prying for small arthropods or opening a doorway into a new home. Large birds routinely oust residents in tree cavities and enlarge the entrance. Macaws search for such conditions to raise their own young. Sometimes, the competition between macaw pairs for nest cavities is so fierce that they have been known to forcibly evict the resident pair and push their young out of the nest. When a poacher cuts a nest tree to extract the young, he/she damages the population with a double impact. The study concluded in their study that releasing great green macaws bred in captivity would not help the wild population because there is inadequate feeding and nesting habitats to sustain them. The best way to save this bird is to restore its native forest.



¹ Powell, G., Wright, F., Guindon, C., Alemán, U., Palminteri, S., Bjork, R. 1999 Research Findings & Conservation Recommendations for the Great Green Macaw (*Ara ambigua*) in Costa Rica Unpublished

What goes on at ASCOMAFOR?

Residents from the communities of Santa Elena, Quebrada Grande, Garabito, Sahino and San Marcos have united to form ASCOMAFOR, an organization that serves as a voice for the inhabitants of the area and the forest around them. Within this body are many associations specific to each area. These areas are primarily rural and sparsely populated and so it is difficult to gain recognition from the government without such an organized body. Under the pretext of this organization, its members work together to establish self-sufficient and environmentally sustainable means of generating income. In Quebrada Grande, for example, there are eight associations (four of mixed gender and four women only), one of which is Ecoturismo Cultural Campesino (Rural Cultural Ecotourism). Under the direction of Olga Vargas Luna (also treasurer of ASCOMAFOR), ECC involves women of Quebrada Grande in the cultivation and sale of *Tilapia* fish. Money generated from this endeavor provides an alternative source of income to families that live on a subsistence level. In Costa Rica, as in all of Latin America, women typically manage household duties and are not always able to directly contribute to the economy of the family. Projects such as this cooperative fish farm help empower women and sustain their families.

Another aim of ASCOMAFOR is the improvement of the local environment. Essentially, this is a two-part program of reforestation and environmental education. Reforestation of the area helps the environment in many ways. Firstly and most apparently, it helps restore the local environment to its original state by returning its native trees. Eventually, animals that once inhabited the area will return from neighboring protected lands, repopulating the renewed forest. Most tropical trees are dependent upon animals such as birds, bats and small mammals for cross-pollination and seed dispersal. As the animals return, they continue to fertilize and spread new species of plants.

Trees are also essential for the maintenance of soil. Since the rate of decomposition and use of nutrients by living creatures is so high in the rainforest, few nutrients have a chance to leach far into the soil. The huge majority of nutrients are found in the leaf litter (humus) just at the surface. When the trees of a rainforest are removed, so too are the nutrients of the soil in just a few rainstorms. Farmers quickly find that such lands are impoverished after a few years of raising bananas or cattle and press further into virgin forest, usually leaving the abandoned farmland cleared of trees. That is why reforestation projects such as that conducted by ASCOMAFOR are essential. In cooperation with the Green Macaw Commission, the Pital communities are replanting a variety of native rainforest trees, particularly the almendro. Nobody knows how long it takes rainforest to recuperate or if it is even possible, but planting trees now is a positive step towards this aim. As trees grow the spreading root systems bind the soil, which means natural debris is kept from washing away and clouding nearby rivers, lakes and seas (yes, there is such thing as pollution from natural substances). The Pital communities protect 294 acres (119 hectares) of primary forest and have already reforested an additional 24.7 acres (10 hectares) without support from the national government.

The communities outlying Pital are certainly a unique group. It is unusual that older members of a society come to realize the importance of nature and take bold steps to save it. To ensure that the objectives of ASCOMAFOR are pursued in the future, members of the organization participate in the environmental education of local people, with a particular emphasis on school-aged children. Representatives visit local schools and give entertaining and informative interactive lectures about the rainforest, its inhabitants, its importance and how to save it. With support from the Ministry of Education, they have constructed two new schoolhouses in the region. The association has also organized environmental awareness events such as parades, nature hikes and Earth Day activities. By fostering an appreciation of the beauty and significance of their surroundings, the organization hopes to encourage young people to stay in the area and to take care of the forest in the future. In response to their efforts, several student environmental groups have already formed, composed of children as young as seven years old.



Activities and Accommodation

One way in which ASCOMAFOR seeks to gain support for its cause is through ecotourism. There is some primary rainforest in the area, which the association works diligently to protect, partly as a means of drawing people to the area to learn and understand the beauty of pristine forest. This involves the maintenance of trails and in some communities, the construction of an observation tower overlooking the area. Foreign governmental and tourist organizations contribute to ASCOMAFOR through the provision of funds, equipment and volunteers. The Dutch and English Embassies have provided donations that are used in trail maintenance, reforestation, family assistance and reimbursement to representatives of the organization. The communities work to restore the environment without salary and contribute their own money to sustain ASCOMAFOR. Ecotourist groups such as EcoTeach provide funds in exchange for visits by student groups and volunteers to participate in reforestation, trail upkeep, creek cleaning and English teaching. This latter skill is important to the local people so that they can communicate with visiting groups, and the communities are always interested in attracting foreign volunteers.

Activities

The Pital excursion is one of the best chances for the student group to get to know Costa Rican campesinos and the only one for students to directly participate in rainforest restoration. Upon arrival, the group will be received by members of the surrounding communities. The people in this area are very friendly, welcoming and curious about the ways of newcomers, so you will likely find them very easy to get along with. This is also a great way to practice your Spanish. Don't worry, the people are generally very patient and the children persistent! The students can participate in a variety of activities with the townspeople, including soccer, dancing or just friendly conversation. They will be welcomed into the homes of local families. It is typical in Costa Rica for at least three generations of a family to live in the same house, so you will discover the campesino way of life from a range of perspectives. They will be just as curious about your way of life as you about theirs, so brush up on your personal Spanish before going.

Students will participate in the reforestation program by planting sapling trees, especially almendros, in a designated protected area. Guides and representatives of the community project will also lead the group on a tour of their particular area, covering residential, farms, secondary and primary forest, describing human activities, local wildlife and discussing their future. There are chances of checking out many fascinating birds, insects and plants and maybe a snake, sloth or paca. Some groups will scale a 25" (8m) tower overlooking the rolling hills, sprawling plains and dense jungle. From above the trees, keep your eyes out for one of three monkey species, toucans, guans and the rare great green macaw.

Accommodation

If you are looking for luxury, you will very lucky to wind up in a house with a TV. The lesson of the Pital homestay is to learn about the campesino lifestyle by *living* it. The group will be divided up and three to four students will stay with each participating family (along with a translator who will help out with communications when necessary!) All of the houses have electricity and running water, but they are otherwise rustic. Guests will share a dinner of Costa Rican specialties such as gallo pinto, platano maduro and yucca with their host families. Meals don't come any fresher than dinner on a farm. The rooster is usually the first one up, sometimes before even the sun. People who live off the land usually follow closely behind. Birds are most active first thing in the morning, so going outside for your morning stretch could be a great reward.

