Cotton-top Tamarin

Saguinus oedipus (Linnaeus, 1758)
Colombia
(2008)

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Cotton-top tamarins are Critically Endangered and found only in northwestern Colombia. They have an extremely limited distribution, occurring in northwestern Colombia between the Río Atrato and the lower Río Cauca (west of the Río Cauca and the Isla de Mompos) and Rio Magdalena, in the departments of Atlántico, Sucre, Córdoba, western Bolívar, northwestern Antioquia (from the Uraba region, west of the Río Cauca), and northeastern Chocó east of the Río Atrato, from sea level up to 1,500 m (Hernández-Camacho and Cooper 1976; Hershkovitz 1977; Mast *et al*. 1993). The southwestern boundary of the cotton-top's range has not been clearly identified. Mast *et al.* (1993) suggested that it may extend to Villa Arteaga on the Río Sucio (Hershkovitz 1977), which included reports of cotton-top tamarins in Los Katios National Park. Barbosa *et al.* (1988), however, were unable to find any evidence of cotton-top tamarins in this area or in Los Katios, where they saw only *Saguinus geoffroyi*. Groups have been seen in the Islas del Rosario and Tayrona National Park in the Sierra Nevada de Santa Marta (Mast *et al.* 1993; A. Savage and L. H. Giraldo pers. obs.). However, these populations were founded by captive animals that were released into the area (Mast *et al*. 1993), and we believe to be outside the historic range of the species.

Colombia is among the top ten countries suffering deforestation, losing more than 4,000 km^2 annually (Myers 1989; Mast *et al*. 1993). There are just three protected areas in the historic range of the cotton-top tamarin—Parque Nacional Natural Paramillo (460,000 ha), Santuario de Flora y Fauna Los Colorados (1,000 ha) and Montes de María Reserve (7,460 ha). These protected areas have lost 42%, 71%, and 70% of their forests, respectively, since they were created (Miller *et al*. 2004). Cotton-tops can also be found in forest patches on private land, but there they lack the long-term protection of their natural resources. Land use in the region is dominated by large-scale agricultural production (cattle) and farming. Forest remnants can be found only where the land is unfit for agriculture, and their long-term survival, buffering agricultural zones, is constantly threatened.

The extraction and exploitation of natural resources is constant in Colombia's Pacific coastal region. The Plan Pacifico (see Barnes 1993) entails that 160,000 ha (approximately 2.2% of the total forest area) are destroyed each year for wood and paper or to make way for agro-industrial production of African palm. There has been a considerable drop in mangrove coverage with the installation of commercial shrimp farms, and massive sedimentation and mercury contamination in rivers has been caused by deforestation and uncontrolled mining. Riverbanks have also been eroded, which has caused river beds to drop, threatening fish stocks and the ability of communities to transport goods (Barnes 1993).

Further threat lies in the imminent flooding of

forests for hydroelectric projects. One of these, the Urra I dam, inundated more than 7,000 ha of primary and secondary forest in the Parque Nacional Natural Paramillo. The environmental impacts of the dam were seriously damaging for local communities and wildlife. The construction of Urra II was proposed in 2008, and if approved by the Colombian government, it will result in the destruction of a further 5,000 ha of forest in the park.

In the late 1960s and early 1970s, 20,000–40,000 cotton-top tamarins were exported to the United States for use in biomedical research (Clapp 1972; Hernández-Camacho and Cooper 1976). Today, cotton-top tamarins continue to be threatened by capture for the illegal pet trade, despite international laws condemning the activity. A recent population census was conducted in the historic distribution of the species that documented a dramatic decline in suitable habitat, and concluded that fewer than 6,000 cotton-top tamarins remain in the wild (Savage *et al*. in review a). Large expanses of forest (500 ha or more) that could support viable cotton-top tamarin populations do not now exist in the departments of Atlántico and Bolívar. What remains are numerous small, isolated forests with tiny remnant populations of cotton-tops. Dispersal opportunities for these animals are limited as the forest patches are surrounded by open land such as cattle pasture. Efforts to protect these forest patches, while creating corridors, are essential to ensure the survival of this Critically Endangered species.

To aid in the conservation of the cotton-top tamarin, we established Proyecto Titί (<www.proyectotiti.com>), a multi-disciplinary, *in situ* conservation program that combines field research, education initiatives and community development for the conservation of natural resources that is economically feasible for local communities in Colombia. The program works with national and international organizations to assist in the long-term preservation of the cotton-top tamarin and to develop local community advocates to promote conservation efforts in Colombia. Early studies (1988 at Colosó in the Montes de Maria reserve) revealed that there were many myths and misconceptions about the forest and the wildlife. More than 90% of the population we surveyed had no idea that cotton-top tamarins were endemic to Colombia and not found in other countries (Savage *et al*. 1997). We developed classroom and field activities for elementary and secondary school children that were designed to create an awareness of the plight of the cotton-top tamarin and engage students in a variety of activities in the classroom and field, and in international exchanges that would promote the conservation of Colombia's natural resources (Savage 1993, 1997; Savage *et al*. 2000a, 2000b; Giraldo *et al*. 2003). Our education program continued to expand to include teacher-training programs, the establishment of a rural school dedicated to conservation and sustainable farming practices, and field training for Colombian university students. We developed a strong partnership with the Barranquilla Zoo, and we now reach urban audiences though a series of classroom workbooks (CARTITILLA) aimed at 5–7th grade school children (Guillen 2003). Urban communities were limited in their understanding of wildlife conservation issues and were the primary market for the illegal pet trade of cotton-top tamarins. The workbook focused on the cotton-top tamarin and its tropical ecosystem including knowledge-based activities, interactive games, role-playing scenarios, and inquiry-based questions that would lead students to a conservation-based discovery. It was used in 15 schools with more than 3,000 students. Our evaluations showed an 81% increase in the level of accuracy on correctly identifying a cotton-top tamarin, a 77% increase in understanding that cotton-top tamarins are found only in Colombia, and a 65% increase in the understanding of the pet trade as a threat to the survival of the species. Regional pride was instilled in these students so that they were more interested in exploring opportunities that would help to protect cotton-top tamarins for the future (Guillen 2003). Our extensive education program has created knowledgeable individuals that are concerned for the environment.

However, pressing economic issues created a disconnection between our efforts to educate communities to conserve natural resources and their ability to engage in activities that promoted wildlife conservation. In discussions with local villagers in Colombia we discovered the traditional Colombian "binde", a small cooking stove that was made from a termite mound (Savage *et al*. 1997). Interviews with local villagers indicated that bindes required less firewood than cooking over an open fire. While accepted by local communities in Colombia, bindes were made from termite mounds and they would quickly crack and disintegrate with repeated use and were consequently little favored. Proyecto Titί designed a durable binde made of clay that was readily accepted by the communities and proved to significantly reduce the amount of firewood consumed. A family of five used approximately 15 logs a day to cook their food over an open fire. Using a binde, the number of logs consumed each day was reduced by two-thirds (Savage *et al*. 1997). Food cooked in a binde did not take significantly longer to cook than over open fire, and it retained its flavor better. Since bindes produce less smoke, women reported less eye and lung irritation than when cooking over an open fire (Savage *et al*. 1997). Bindes proved to be a successful tool in

reducing the amount of trees harvested for firewood, besides improving the health of the villagers.

Efforts to manage waste are a challenge in local villages, and the situation is worsening, particularly in growing rural communities where disposal is generally by burning or by dumping in rivers or on the roadside. Enormous amounts of plastic appear in the forests; waste which animals tend to investigate or eat, resulting in disease transmission between humans and wildlife. A program was developed to turn the trash into a source of income. The goal was to create an artisan group that would make a product from the numerous plastic bags, so as to provide a stable income that, combined with effective conservation education messaging, would result in a commitment to protect the forests, and reduce the capture of cotton-top tamarins for the illegal pet trade. Proyecto Titi first engaged the village of Los Limites (population of 250) in protecting cotton-top tamarins and their habitat by helping it with the confection of tote bags crocheted with recycled plastic bags and called "eco-mochilas" (Savage *et al*. in review b). Fifteen women—heads of households and well-respected in their community—began the initiative, and were so successful it was necessary to provide business training as they became established entrepreneurs, developing products of a quality that sells in national and international markets. ASOARTESANAS was created in 2004 with 15 founding members and a five-person board of directors.

Proyecto Tití demonstrated a clear economic benefit to individuals that participate in community empowerment programs and produced tangible results that are contributing to the survival of the cotton-top tamarin in Colombia. To date, ASOARTESANAS has trained more than 600 women and recycled nearly 1.5 million plastic bags, and continues to reach out to communities and cities to assist in the collection of plastic bag litter, which has decreased in rural communities and is now rarely seen in the forest. This has had positive implications in reducing human and wildlife health concerns in the region, and has been positive for the cotton-top tamarin in the cessation of their trade as pets and in protecting their habitats through a substantial reduction in the number of trees harvested for firewood.

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