



**EXECUTIVE SUMMARY OF NATIONAL ACTION PLAN FOR
THE CONSERVATION OF THE PIED TAMARIN**

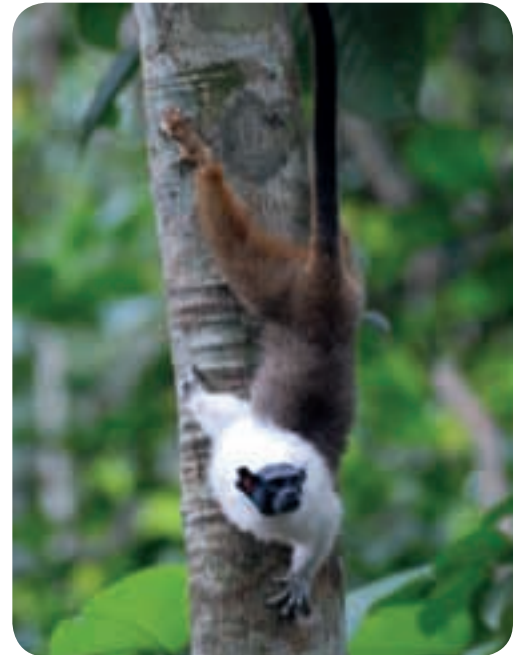


Brazil has the largest diversity of primates in the world. The 135 known species and subspecies found in the country represent more than 20% of all extant primate taxa. In the Brazilian Amazon alone, more than 70 species and subspecies have been registered.

Primates is the mammal order with the largest number of threatened species in the world. Almost 20% of Brazilian primates are on the Official List of Brazilian Fauna Species Threatened with Extinction. Of these, 10 are considered to be critically endangered, the most dangerous risk category, and these include the pied tamarin (*Saguinus bicolor*).

The pied tamarin is one of the mammals that is most threatened in the entire Amazon biome. This small simian is highly endemic, with a distribution that is restricted to the same area of the largest urban nucleus in Amazonia. Since the 1970s, studies have shown evidence of a significant reduction in its area of occurrence and in the size of the populations of this species. This, for the most part, is due to the growing human population and the disorganized urban and rural expansion in the municipalities of Manaus, Rio Preto da Eva and Itacoatiara, in the state of Amazonas. Most pied tamarin populations will disappear in a few decades if action is not taken to change this situation.

Thus, the Chico Mendes Institute for Biodiversity Conservation (ICMBio) established the National Action Plan for the Conservation of the pied tamarin as a pact with society, consolidating the public policy of the joint Ordinance # 316/2009 - ICMBio/MMA. This NAP should be implemented during the next 5 years, in an attempt to reverse the situation of this primate.



Marcelo Gordo

Taxonomy

Phylum: Chordata

Class: Mammalia

Order: Primates

Family: Callitrichidae

Genus: *Saguinus*

Species: *Saguinus bicolor* (Spix, 1823)

Popular Names: Sauim-de-coleira, sauim-de-Manaus, sauim-de-duas-cores. In English they are also known as pied tamarin.



Dominic Wormell

BIOLOGY

Adult individuals of *Saguinus bicolor* weigh between 450 and 550 grams and measure from 28 to 32 cm in length (head and body), with a thin tail of approximately 38 to 42 cm. Besides reduced body size, all tamarins have claw-like fingernails, except for the hallux (big toe), which helps in vertical movement upon branches and in obtaining food. The tail does not have a prehensile function, but helps in balance while in motion.

The name 'pied tamarin' comes from the white skin on the back of the head, neck, upper regions and thorax. The fur varies from brownish orange to dark brown or light brown in the dorsal region, the lower limbs and the inside of the tail. The dorsal side of the tail is black. The other predominant characteristic is the hairless black skin on the face, head and ears. The offspring are born with hair identical to that of adults, but, when still very



young, they have white hair on the head. The species does not exhibit sexual dimorphism.

Its diet is composed of small vertebrates (amphibians and lizards), eggs and young birds, insects, fruit, sap from several trees and sometimes, nectar and flowers. The pied tamarin demonstrates diurnal behavior, becoming active just after sunrise, resting late morning/early afternoon (coinciding with the hottest hours of the day) and searching for a place to sleep about two hours before sunset.

The pied tamarin forms groups of different sizes varying from two to 12 individuals with one dominant female. However, both male and female solitary animals are occasionally sighted. Both sexes can disperse to join other groups, or try to form a new group, generally after the second or third year of age.

Pied tamarins are extremely territorial and physical confrontations may occur between neighboring groups. They commonly mark their territory by using their circumgenital and suprapubic glands, which have a characteristic odor indicating that the area is occupied.

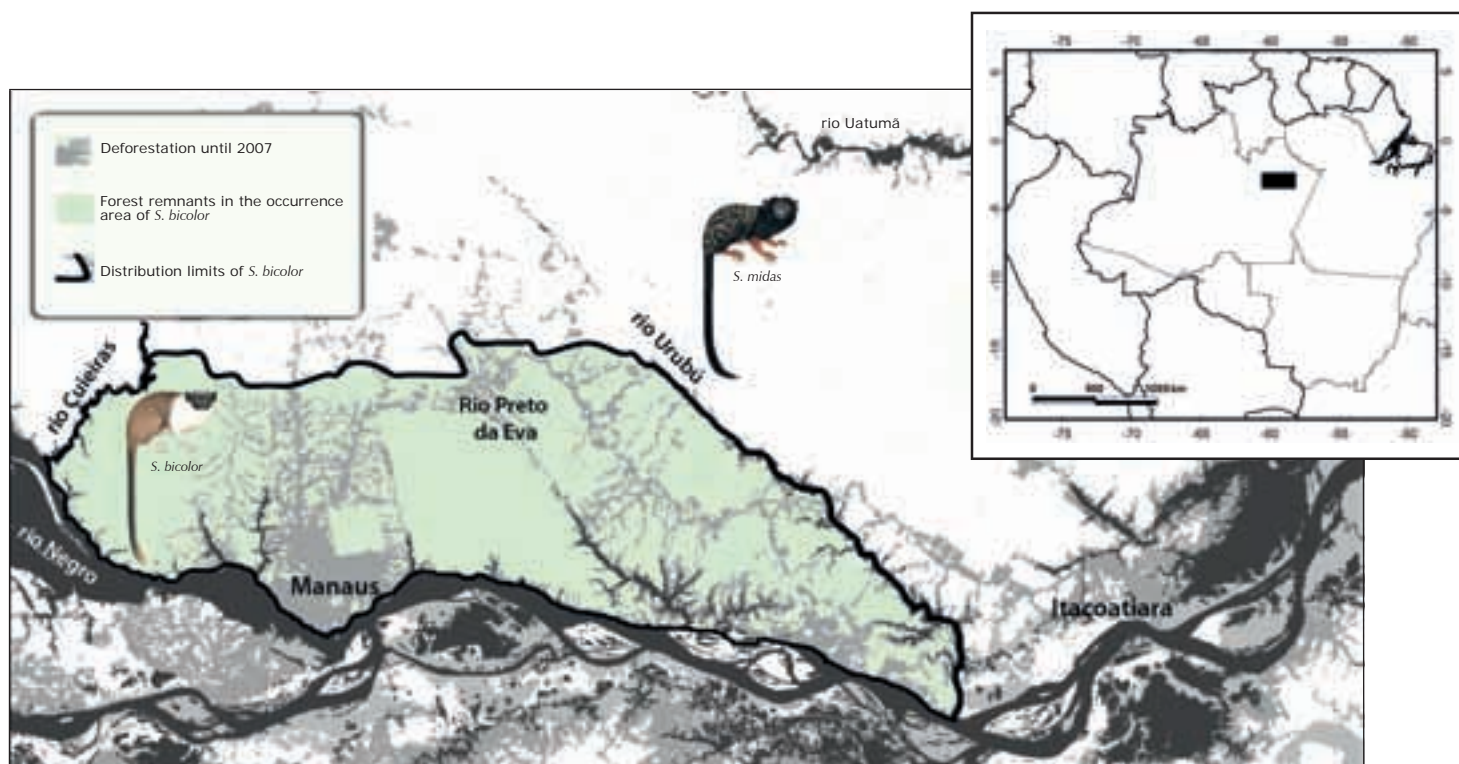
The urban forest fragments where they live in Manaus are very varied, and range size is estimated to be between eight and 65 hectares per group. In primary forests, range size can reach up to around 100 hectares.

Reproduction can occur up to twice per year. The reproductive and dominant female can give birth to one or two infants (twins) and after a few weeks the infants are cared for by all group members. Triplet births have been documented in captivity, but it is a rare event. The offspring grow quickly, and can reach adult weight in a little over a year. The gestation period varies between 185 and 195 days.

GEOGRAPHIC DISTRIBUTION

The pied tamarin has a geographic distribution restricted to the townships of Manaus, Rio Preto da Eva and Itacoatiara, an area of approximately 7500 km².

It is believed that the current limit of the pied tamarin's easterly distribution is the western bank of the Urubu River, but formerly, it was found west of the same river. The western limit is the eastern bank of the Negro and Cuieras Rivers. The limit to the south is the Negro and Amazonas Rivers. To the north, it is assumed to be an imaginary east-west line, which passes through the Campinarana vegetation on the eastern bank of the Cuieras River at km 35 of the BR-174 highway, by the New Millennium and ZF-7 branch roads in the township of Rio Preto da Eva and to the east the Urubu River, coinciding approximately with the southern limit of the distribution of *Saguinus midas*.





OCCURRENCE IN PROTECTED AREAS

The pied tamarin is present in 18 protected areas, nine of which are private (RPPN), and nine public (both in Strictly Protected and Sustainable Use categories). Together, these protected areas comprise around 20% of the area in which the species occurs. Despite this significant protected area, ecological data on the pied tamarin show that these protected areas are inadequate in size and categories for the conservation of the species. Also, there is little information available about the situation of the pied tamarin in several of these protected areas, such as the Rio Negro State Park – Southern Section.

Other forested areas in Manaus city and its surroundings, and in the townships of Rio Preto da Eva and Itacoatiara, also have *Saguinus bicolor* populations. This includes the Jungle Warfare Instruction Center (CIGS/ Brazilian Army), Adolpho Ducke Forest Reserve (INPA), Amazonas Federal University campus (UFAM), Walter Egler Forest Reserve, Iporá settlement area and other important blocks of forest. However, they are not part of the National System of Protected Areas (SNUC) or the State (SEUC) or Municipal systems of protected areas. These areas are not assisted by these systems, such as the establishment of a surrounding buffer zone, or organized activities within their boundaries. As such, these areas will not be able to offer guarantees of protection that are proposed for different categories of protected areas.

PROTECTED AREA		Administrative level
Urban Area	Sumaúma State Park	State
	Sauim-Castanheiras Wildlife Refuge	Municipal (Manaus)
	Mindu Municipal Park	Municipal (Manaus)
	Nascentes do Mindu Municipal Park	Municipal (Manaus)
	Tarumã – Ponta Negra Municipal Environmental Protection Area	Municipal (Manaus)
	Honda Natural Heritage Private Reserve	Private
	Nazaré das Lajes Natural Heritage Private Reserve	Private
	Reserva dos Buritis Natural Heritage Private Reserve	Private
	Aguas do Gigante Natural Heritage Private Reserve	Private
	Sócrates Bomfim Natural Heritage Private Reserve	Private
Rural Area	Rio Negro State Park – Southern Section	State
	Eastern Bank of the Rio Negro Environmental Protection Area – Tarumã Açu/ Tarumã Mirim Section	State
	Eastern Bank of the Rio Negro Environmental Protection Area – Aturiá- Apuauzinho Section	State
	Tupé Sustainable Development Reserve	Municipal (Manaus)
	Norikatsu Myamoto Natural Heritage Private Reserve	Private
	Sítio Bons Amigos Natural Heritage Private Reserve	Private
	Bela Vista Natural Heritage Private Reserve	Private
	Laço de Amor Natural Heritage Private Reserve	Private

CONSERVATION STATUS

The pied tamarin, *Saguinus bicolor*, is currently on the Official List of Brazilian Fauna Species Threatened with Extinction, established by the Instruction Norm #3 issued on May 27, 2003 organized by the Environmental Ministry. In the Red Book of Fauna Threatened with Extinction, the pied tamarin is categorized as Critically Endangered, but during the last review of the species by the International Union for Conservation of Nature (IUCN), the pied tamarin was considered to be in the Endangered category. In both cases, the reduction of the pied tamarin's already restricted geographic distribution, combined with population declines, are considered the main factors that threaten the species.



MAIN THREATS

The main threat to the pied tamarin is the destruction of its habitat, by deforestation and fragmentation of forests along its geographic distribution, mainly near Manaus and along the highways.

The city of Manaus, located in Central Amazonia, comprised less than 500,000 inhabitants in the 1970s. During that time, the federal government, with the objective of developing the Amazon, began the Manaus Free Zone. The Free Zone has fiscal incentives for industries and importers that establish themselves there. It is made up of the Manaus Industrial Hub and the SUFRAMA Cattle Ranching District, which is currently active and represents more than 90% of the state's economy.



Fábio Röhe



Fábio Röhe

After the industries moved to Manaus, the region began to grow in a disorganized manner at an alarming rate. Today, the region's population is around 2 million inhabitants. This growth has led to deforestation and fragmentation of contiguous forests, causing the formation of innumerable islands of vegetation in the middle of a hostile urban matrix. The remaining forests continue to be explored and degraded. Today, many forest fragments are disappearing, or are condemned and being used for housing, buildings and highways.

With the establishment of the Cattle Ranching District and Manaus' continued growth, there was an increase in demand for food and natural resources from the rural areas nearby, and a search for sites and cottages by city dwellers. This has resulted in increased occupation of the countryside, resulting in deforestation and fragmentation, hunting, logging and the growth of neighboring cities

Studies have detected a reduction in the genetic variability of pied tamarins in forest fragments in Manaus. This is mainly due to drastic reductions in the original populations. Besides this, the isolation that these populations have been subjected to as a result of restricted mobility in urban areas (houses, streets etc) offer fewer chances of tamarin movement between fragments, thereby increasing chances of mating between relatives. Population reduction and isolation can also result in an increase in endogamy, reduction of gene flow and genetic erosion of the populations that could bring with them serious problems for the survival of the remaining populations.

However, the evidence for these genetic changes is associated with demographic changes, ecological characteristics, behavior and social aspects of each species. In the case of isolated pied tamarin populations in small fragments, the ecological, demographic and stochastic factors act on the survival of these populations in a manner that is more severe and rapid than the time required to detect signs of genetic erosion.

The changes in Forest Code legislation and land regularization in the Amazon may potentially exacerbate the threats of reduced size and fragmentation of habitats on pied tamarin populations. Recent proposals may encourage greater residential occupation in the rural area including areas of pied tamarin occurrence, resulting in deforestation and forest fragmentation considerably above what is currently



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observed. Once the rules are approved to regulate land occupation and amnesty is offered to offenders for previously incurred deforestation, which is what the new Forest Code proposes, this could also reduce obligatory legal reserves and compromise riparian forest that is often the only legal mechanism for the maintenance of connections between areas of forest.

The capture of pied tamarins for commerce, or pets, exists but it is not common, especially when compared with other primates. However, in urban areas, villages and communities with higher densities of humans, pied tamarins are frequently attacked by dogs and cats, or mistreated (by children stoning them with slingshots). They also suffer accidents with electrical wires and are run over. There are also relatively frequent records of road kill along the highways outside of the urban areas, the BR-174 and AM 010.

There is a hypothesis that there is competition between the pied tamarin and another species of the same genus, the golden-handed tamarin (*Saguinus midas*), along the northern, northeastern and eastern edges of the geographic distribution of *Saguinus bicolor*. Apparently, the golden-handed tamarin is enlarging its distribution, excluding the pied tamarin. It is a complex situation that should be studied in detail to confirm the hypothesis and verify if it is a natural process, or if it is being induced by anthropogenic actions on the environment.



Marcelo Gordo

STRATEGY OF THE CHICO MENDES INSTITUTE FOR THE CONSERVATION OF THE PIED TAMARIN

In 1998, IBAMA created the Working Group for the Conservation and Management of *Saguinus bicolor bicolor*. This group was formed by diverse institutions and specialists with the aim of developing strategies for research, management and protection of the pied tamarin, with the objective of establishing a sustainable genetic population (Ordinance #1.588/1998). In 2004, this group was changed to the International Committee for the Conservation and Management of *Saguinus bicolor bicolor* by Ordinance # 04-N/2004. In 2005, with the revision of Committees for primate conservation, the pied tamarin was studied with a broader scope by the International Committee for the Conservation and Management of Amazonian Primates formalized by Ordinance # 82/2005.

These groups of institutions and specialists met on five occasions:

1. June 1997, Rio de Janeiro - 1st Meeting of the Working Group for the Conservation and Management of *Saguinus bicolor*
2. November 2001, Manaus - 2nd Meeting of the Working Group for the Conservation and Management of *Saguinus bicolor*.
3. February 2004, Manaus - 3rd Meeting of the Working Group for the Conservation and Management of *Saguinus bicolor*.
4. September 2005, Manaus - Workshop for Threatened Amazonian Primates
5. April 2007, São Luis – 1st Meeting of the International Committee for Conservation and Management of Amazonian Primates.

Following the guidelines of the Joint Ordinance Nº 316/2009 of MMA and ICMBio, the National Center for Research and Conservation of Brazilian Primates, held a meeting in Manaus in August 2010, to update and prepare an Action Plan for the species, with some specialists and institutions involved in previous working groups and committees. Consequently, on May 24-27th, 2011, a Participative Planning Workshop was held in Manaus to write the National Action Plan (NAP) for the Conservation of the Pied Tamarin. The NAP listed 38 actions to reach 7 goals that aim to achieve the stated objective of ensuring at least 8 viable populations of *Saguinus bicolor*, thus reducing the rate of population decline and guaranteeing protected areas for the species in 5 years. This is based on analyses of population viability conducted to supply information for the NAP. Viable populations are considered to be those that have at least 500 individuals occupying areas of at least 10,000 hectares.



NATIONAL ACTION PLAN FOR THE CONSERVATION OF THE PIED TAMARIN, *SAGUINUS BICOLOR*

Nº	GOAL/ACTION	Cost (Us\$)
1.	To include at least 30% of the area of distribution of <i>Saguinus bicolor</i> in protected areas with adequate management of the conservation of the species and include at least 15% of the protected areas under integral protection and maintain relevant forest remnants (CIGS/Army and Ducke Reserve/ INPA), by 2016.	92,500.00 to 95,000.00
1.1	Conduct studies on the density distribution of <i>Saguinus bicolor</i> , to qualify the selection of prioritized areas for the creation of protected areas (preferably in fragments larger than 10 000 hectares)	75,000.00
1.2	Map areas of occurrence of <i>Saguinus bicolor</i> and identify priority areas for its conservation, considering the potential creation of protected areas and habitat connectivity.	Insignificant
1.3	Manage with government agencies to create protected areas (ICMBIO/DIREP/ CCUC, SDS/CEUC, Municipal Prefectures of Manaus, Itacoatiara and Rio Preto da Eva)	2,500.00 to 5,000.00
1.4	Coordinate work with the SDS to maintain the maximum area of PAREST Rio Negro - South Sector as a protected area with integrated protection.	Insignificant
1.5	Coordinate with the Brazilian Army and the INPA the long-term maintenance of relevant remaining areas (CIGS/Army and Ducke Reserve/INPA).	2,500.00
1.6	Coordinate with the large landowners the long-term maintenance of forest remnants contained on their properties.	5,000.00
1.7	Prepare a diagnosis on the existence and status of implementing the management plans of the protected areas in the distribution area of <i>Saguinus bicolor</i> .	Insignificant
1.8	Coordinate work with environmental agencies on the creation and strengthening of management plans and increased enforcement actions aimed at <i>Saguinus bicolor</i> conservation in protected areas with species occurrence (Mindú M.P., Nascentes do Mindú M.P., Sauim-Castanheiras WLR, Tupé SDR, Tarumã-Ponta Negra Municipal EPA, Eastern Bank of the Rio Negro EPA – Tarumã Açú/Tarumã Mirim Section, Eastern Bank of the Rio Negro EPA – Aturiá-Apuauzinho Section and others indicated from the diagnosis), with priority given to APA Tarumã-Açú/Tarumã-Mirim and Aturiá-Apuauzinho.	7,500.00
1.9	Evaluate existing management plans for protected areas with <i>Saguinus bicolor</i> occurrence (Rio Negro State Park – Southern Section, among others) in light of species conservation and forward proposals to the advisory board of the qualifying units.	Insignificant
2.	To increase the connectivity between areas occupied by <i>Saguinus bicolor</i> , prioritizing areas above 10 thousand hectares and increasing the connectivity in at least 30% of urban fragments of interest for conserving the species within the complex forest remnants called “Bacia do Mindú”, “Tarumã-Ponta Negra” and “Distrito Industrial” by 2016.	2,506,500.00
2.1	Identify and inform competent institutions in priority areas for overseeing occupation and irregular activities (mining, logging, establishment of large estates) with consequences for populations of <i>Saguinus bicolor</i> .	Insignificant
2.2	Prepare a diagnosis on the connectivity of habitats indicating those relevant for the establishment of corridors for populations of <i>Saguinus bicolor</i> .	1,500.00
2.3	Prepare a plan for the connectivity of habitats for populations of <i>Saguinus bicolor</i> , considering the risks of <i>Saguinus midas</i> expanding into these areas.	3,000.00
2.4	Implement a plan for connectivity of habitats for populations of <i>Saguinus bicolor</i> , considering the risks of <i>Saguinus midas</i> expanding into these areas.	2,500,000.00
2.5	Identify the ZEE of SUFRAMA and PAEs of INCRA (implemented and planned) activities inadequate for the conservation of <i>Saguinus bicolor</i> .	1,000.00
2.6	Propose and articulate with SUFRAMA and with INCRA the qualification of PAE and ZEE towards the conservation of <i>Saguinus bicolor</i> .	1,000.00
2.7	Coordinate work with licensing and protection agencies (SEMMA and IPAAM) and MPE compliance with environmental regulations in the urban area, with special attention to complex forest remnants to allow for future connectivity between fragments (<i>Saguinus bicolor</i> habitats).	Insignificant
2.8	Coordinate work with environmental and overseeing agencies (IPAAM and IBAMA), the Environmental Police, MPE and MPF, for the realization and recovery of APP and RL.	Insignificant
3.	To establish and implement an integrated program of research to understand the mechanisms related to the expansion of <i>Saguinus midas</i> in areas where <i>Saguinus bicolor</i> occur and to increase knowledge about the medical-sanitary conditions of the environment with implications for the conservation of the species, by 2016.	502,500.00 to 630,000.00
3.1	Develop an integrated research program to understand the mechanisms related to the expansion of <i>Saguinus midas</i> into areas of <i>Saguinus bicolor</i> occurrence. The research program minimally containing: hypotheses, prioritization of hypotheses, study designs and timelines for implementation.	Insignificant
3.2	Implement an integrated program of research to understand the mechanisms related to the expansion of <i>Saguinus midas</i> into areas of <i>Saguinus bicolor</i> occurrence.	250,000.00 to 375,000.00
3.3	Develop an integrated research program to increase knowledge about the medical-sanitary conditions of the environment with implications for the conservation of <i>Saguinus bicolor</i> .	2,500.00 to 5,000.00
3.4	Implement the integrated program of research to increase knowledge about the medical- sanitary conditions of the environment with implications for the conservation of <i>Saguinus bicolor</i> .	250,000.00



4.	To implement the Official Management Program, including in captivity, for the conservation of <i>Saguinus bicolor</i> , by 2016.	15,000.00
4.1	Gather a group of experts for the preparation of the management program for <i>Saguinus bicolor</i> .	Insignificant
4.2	Formalise an expert group to develop the management program for <i>Saguinus bicolor</i> .	Insignificant
4.3	Prepare the official in situ and ex situ management program for <i>Saguinus bicolor</i> , considering studies looking at population dynamics and management techniques.	15,000.00
5.	To implement an environmental education program aimed at reducing mortality of the <i>Saguinus bicolor</i> by 50% due to conflicts with human communities, by 2016.	527,500.00
5.1	Form a group to prepare the Environmental Education Program for the conservation of <i>Saguinus bicolor</i> .	Insignificant
5.2	Prepare the Environmental Education Program for the conservation of <i>Saguinus bicolor</i> , considering the entities and the actions already taken or existing, and seeking to standardize procedures and coordinate efforts.	2,500.00
5.3	Execute the Environmental Education Program for the conservation of <i>Saguinus bicolor</i> .	500,000.00
5.4	Reinitiate and improve the Municipal Program of Voluntary Environmental Agents.	25,000.00
5.5	Address topics related to the conservation of <i>Saguinus bicolor</i> in the Program of Voluntary Environmental Agents of IBAMA.	Insignificant
6.	To include by 2016, actions for the conservation of <i>Saguinus bicolor</i> in the development of enterprises and the supply infrastructure, with emphasis on connectivity between areas of relevant interest for the species.	10,000.00
6.1	Identify existing projects in priority areas for conservation of <i>Saguinus bicolor</i> (conforming to maps produced in Action 1.2).	Insignificant
6.2	Promote ongoing management along with core licensing of federal, state and municipal projects in priority areas for conservation of <i>Saguinus bicolor</i> (conforming to maps produced in Action 1.2).	5,000.00
6.3	Articulate partnerships with MPF, MPE and the Specialized Court for the Environment (VEMAQA) for targeting the compensation and TAC, to promote the conservation of <i>Saguinus bicolor</i> .	Insignificant
6.4	Establish the technical advisory group to develop protocols to be used in licensing (inventories, monitoring, impact mitigation, management) for priority and non-priority areas.	5,000.00
7.	To implement 100% of municipal green areas already endorsed, and to maintain and/or recover at least 20% of the forest cover of urban settlements in areas of interest for the conservation of <i>Saguinus bicolor</i> , by 2016.	390,000.00
7.1	Negotiating with the Municipality of Manaus to monitor the revision of the municipal Master Plan, through public hearings and proposals aimed at the conservation of the <i>Saguinus bicolor</i> , including the definition of "Green Area" as "forested area with native species" and protecting their connectivity to other forested areas, especially APP. (rescuing the draft proposal for the Municipal System of protected areas)	Insignificant
7.2	Coordinate with competent agencies increased enforcement and signage of the green municipal areas already endorsed.	25,000.00
7.3	Implement reforestation of municipal green areas already endorsed.	365,000.00
7.4	Coordinate with the MPF, MPE and the Specialized Court for the Environment (VEMAQA) to check possibilities of prioritizing and streamlining processes related to invasion of green areas.	Insignificant
7.5	Articulate partnerships with MPG to collaborate with technical indications for the agreements related to Avenida Gov. José Lindoso, to mitigate negative impacts on the Mindú corridor.	Insignificant
TOTAL ESTIMATED COST		4,044,000.00 to 4,174,000.00

PARTNERS



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