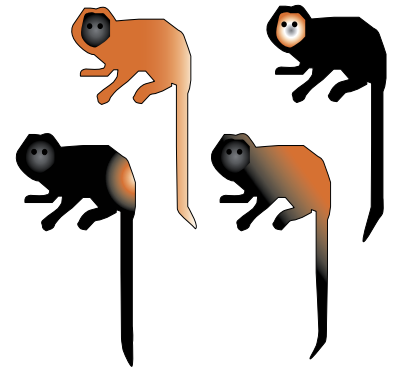


Tamarin tales

Volume 13, 2015

Newsletter of the Lion Tamarins of Brazil Fund



Golden-headed lion tamarins invaders in Niterói

- when an endangered species became a threat

Cecília Kierulff

Groups of *L. chrysomelas* were first observed in a forest fragment in the city limits of Niterói, RJ, in 2002. Golden-headed lion tamarins do not occur naturally in the state of Rio de Janeiro; the natural range of the golden lion tamarin (*Leontopithecus rosalia*). They were released there by a private collector. Golden lion tamarins occur less than 50 km from Niterói, and there was an urgent need to remove the golden-headed lion tamarins. The golden-headed lion tamarins might occupy the territories otherwise available for dispersing golden lion tamarins and will compete with or even expel the native golden lion tamarins. The chances are high that the two species will hybridize (hybrids are known from captive studies), with foreseeable disastrous consequences for the golden lion tamarin, and all the efforts that have been made over the years for its protection and conservation.

In 2009, the Instituto Pri-Matas conducted a survey of golden-headed lion tamarins in the forests of Niterói, RJ. The research was funded by the LTBF (Lion Tamarin of Brazil Fund). In 2011 the Instituto Pri-Matas started to capture and remove the groups of GHLTs in Niterói. The translocation was funded by Margot Marsh Foundation, Fundação Grupo Boticário, Lion Tamarin of Brazil Fund, the Primate Action Fund, The Mohamed bin Zayed



Species Conservation Fund, RBO Energia S.A. and Porto Sudeste (Câmara de Compensação Ambiental/Secretaria do Meio Ambiente Rio de Janeiro) and Tropical Forest Conservation Act/Fundo Brasileiro para Biodiversidade (TFCA/FUNBIO). The capture and relocation of the groups was carried out in partnership with the Instituto Chico Mendes, Instituto Estadual do Ambiente do Rio de Janeiro (INEA-RJ), NGOs and the local community of Niterói, São Gonçalo and Maricá.

Rio de Janeiro Primate Center (CPRJ) provided the land and we used part of the funds we received to build the facilities for the quarantine. The GHLT groups stayed

each one in large cage during 30 days and were then transported by airplane by TAM CARGO (with no costs), and then by car to the release site.

We partnered with the Veterinary School of the University of São Paulo and vets and their collaborators carried out the necessary tests and examinations of the groups for free. The Environmental Institute of Rio de Janeiro state (INEA) refurbished a house inside the forest for the team in Niterói. The Environmental Secretary of Niterói supported and helped us with space for meetings, information on the population and schools in the area. The Instituto Pri-Matas contracted two biologists, two field assistants and

a veterinarian. The biologists spent two weeks with the Golden Lion Tamarin Association team to train in capture and monitoring methods. We also contracted two biologists to conduct the environmental education activities in the local communities (the program was the winner in the PEN's Storytelling Challenge Prize Contest).

From March 2011 and December 2013 we captured 55 groups of *L. chrysomelas* in Niterói (340 individuals), and translocated 49 of them (293 individuals) to Belmonte in Bahia; six groups were not translocated. The Fazenda Taquara, the translocation site for the GHLTs, is owned by Veracel Celulose that protects the area. The site had nearly reached its carrying capacity, and we released groups in forest fragments without lion tamarins in the vicinity of Taquara.

In December 2013 the area was re-surveyed and we estimated that there were at least 50 groups still to capture. After a meeting with all the institutions involved in the project it was decided to not overcrowd the release site—the new groups would be maintained in

captivity. INEA built new enclosures in CPRJ and since then all the groups have been maintained in captivity. By November 2015, we had captured a total of 741 GHLTs (131 groups). The population is probably very inbred since originated from few individuals, because of that both males and females have been sterilized to not interfere in the captive population genetically controlled.

We have already removed almost all the golden-headed lion tamarins in the range of golden lion tamarins. An

estimated three groups or around 15 GHLTs remain, and just a single undetected group could negate all our efforts, seeding a new invasive population. We cannot stop now and we must certify that all individuals were removed or all the effort and money spent would be in vain. Further surveys are vital and have been done to locate and capture all the golden-headed lion tamarins that remain from that first fateful introduction.



Transport in the airport (photo Marina Bueno)



Group being released in the forest (photo Pri-Matas)



New enclosures in CPRJ



GHLT on the roof (photo Marina Bueno)

The black lion tamarin and birds of prey: interactions in the wild

Gabriela Cabral Rezende
Guilherme Siniciato Terra Garbino

Normally, predation of black lion tamarins in the wild would be a natural event. In the small populations in fragments, however, loss of even a single tamarin due to predation can have a significant negative effect on the population, as shown by Vortex modeling during the PHVA workshops (Holst et al. 2006). The 467-hectare fragment in Santa Maria farm (Pontal do Paranapanema, SP), for example, has an estimated population of 20 individuals, and losing one animal due to predation would result in a 5% decrease in the population size.

Here we report five cases of interactions between birds of prey and black lion tamarins that we have observed in the field. The anecdotal cases we report here were observed at Santa Maria (22°14'S 52°18'W, 467 ha) and Ponte Branca fragments (22°24'S 52°30'W, 1306 ha) (FIGURE 1). Both are located in the Pontal do Paranapanema region, in São Paulo state.

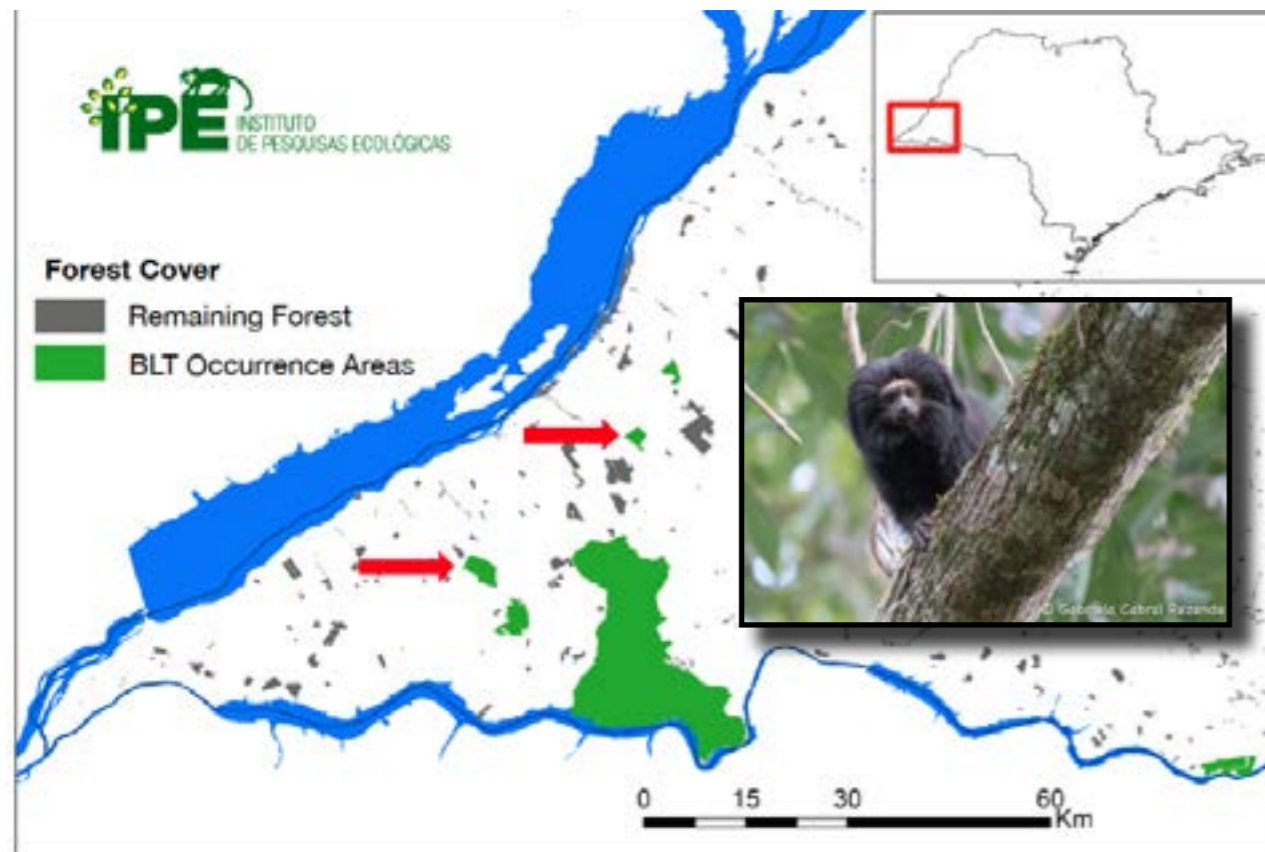


Figure 1: Map showing the forest fragments where black lion tamarins are found in Pontal do Paranapanema, São Paulo state, Brazil. Red arrows indicate Santa Maria (above) and Ponte Branca (below) fragments.



Pygmy owl (*Glaucidium brasilianum*)

Locality: Santa Maria

The pygmy owls (genus *Glaucidium*) are the smallest owls in the world, and their diet is composed mainly of insects, although they also eat birds, lizards, scorpions and mice. The interaction with the black lion tamarin was recorded on September 23, 2014. When the couple of tamarins that were being monitored (group G1) went out of their tree hole, around 7am, they began to answer to the long calls of the third member of the group, a female that probably did not sleep with them in the same hole. Some minutes later a small *Glaucidium brasilianum* that was perched on a branch near the tree hole, overflowed one of the lion tamarins, which went back into the hole immediately.

Although there are records of predation of juvenile white-tufted marmosets (*Callithrix jacchus*) by the burrowing owl (*Athene cunicularia*), we believe that the case reported here was not a predation attempt. The monitored black lion tamarin couple had a body mass of around 600g at the time, and the pygmy owl weighs less than 80g. Our hypothesis is that the tamarins were using the same tree hole used by the pygmy owl, and it was trying to scare the tamarins away from it. Although not eating them, the pygmy owl has been known to attack and kill much larger animals, such as guans (*Penelope*), which weigh > 1,000g.



Great black hawk (*Buteogallus urubitinga*)

Locality: Santa Maria

On October 23, 2014, while we were monitoring the group G1 in Santa Maria, at the time composed of three individuals, one great black hawk landed on a jerivá palm (*Syagrus romanzoffiana*), less than 100m from the tree where the tamarins were. Upon landing on the palm tree, the tamarins noticed the black hawk and emitted warning calls. The hawk kept looking towards the animals but after less than a minute flew away.

It was observed that those black hawks, in Guatemala, preyed upon mammals as large as opossums, but most of their diet consisted of small lizards and snakes (Gerhardt, Seavy & Madrid 2012).



Plumbeous kite (*Ictinia plumbea*)

Locality: Ponte Branca

The plumbeous kite is a migratory species, appearing in São Paulo in the spring and summer. On November 22, 2015, we were habituating a group composed of 5 black lion tamarins, being one juvenile and 4 adults. The group remained on the tree that was used as sleeping site for a couple of hours after first coming out of the

tree hole. Two species of hawks, a plumbeous kite and an unidentified one, were overflying the tree where the group was. It was noted that every time that the birds came closer to the tree, especially when the juvenile was out, one adult of the group would play the alarm call for aerial predators and immediately the other tamarins would go back inside the tree hole or move downwards to a safer place in that tree. It was not recorded any attempt to capture the tamarins by the hawks, but both remained flying and landing at nearby trees for most of the time we were on site.

The plumbeous kite feed mainly on insects, termites and flying ants. Interestingly, Ferrari (1990) reported a feeding association between the plumbeous kite and the buffy-headed marmoset (*Callithrix flaviceps*), where the marmoset flushed out insects that were eaten by the kite. Our observed account, however, appears not to be such case.



King vulture (*Sarcoramphus papa*)

Locality: Santa Maria

The king vulture is considered Vulnerable in the list of threatened birds of São Paulo state, but it is still common at the Pontal. On June 15, 2015, at approximately 8:30 am, the two tamarins of the monitored group G1 were eating fruits of mistletoe (*Santalaceae*), in the canopy, when a king vulture overflew them twice. In both occasions, the tamarins emitted alarm calls.

We have also observed that in other occasions the black lion tamarins emitted alarm calls to king vultures that were perched on exposed branches of high trees, such as perobas (*Aspidosperma* sp.). In any of the observations the king vultures showed signs of aggressive behavior towards the tamarins.



Black-and-white hawk-eagle (*Spizaetus melanoleucus*)

Locality: Santa Maria

One individual of the black-and-white hawk-eagle was flying over the tamarin couple of G1 on September 21, 2014. It subsequently landed on a branch near the tamarins. The animals were startled, emitted alarm calls and went into hiding. This hawk-eagle has been known to attack small monkeys, but it has not been recorded to prey upon them (Ferguson-Lees & Christie 2001).

Conclusion

Based on what we know about the observed bird species, only two, the black-and-white hawk-eagle and the great black hawk, could pose a real threat to the tamarins. It is important to note that most observations were made between September and December, during the months of spring. It coincides with the period that the black lion tamarins are giving birth, probably because youngsters are easily caught by such birds. During this time, sights of bird of prey are more frequent, but an increase in the number of recorded events of such interactions, always followed by responses from the tamarins, can also mean that the monkeys are more alert to eventual predators, even if they do not present a real threat. To the (lucky) fate of those reduced BLT populations, no predation events were recorded.



GHLTs role in forest regeneration under climate change scenarios

Nima Raghunathan

We know that climate change is the most important threat to natural landscapes. Several studies have already shown local extinctions of flora and fauna linked to changes in climates, and documented various migration strategies of other species to counter the effects of increased average temperatures and (unpredictable) changes in seasonality.

In the case of a highly endemic, localised species such as the GHLT, it is not only important to understand how climate change might impact their survival, but especially concentrate on the vegetation that comprises their habitat, because it is not possible to know whether their endemism is linked to climatic variables or other factors.

The LTBF financing helped me collect data on seed dispersal by GHLTs to understand their role in forest regeneration in a mosaic/degraded milieu. These data will be coupled with a dynamic vegetation model (DVM) to determine whether GHLTs might help, hinder or have little effect on the potential migration of tree species under future scenarios of climate change.

How does this work? In the tropics, more than 90% of the vegetation depends on frugivores (i.e. fruit-eating animals) for their seeds to be deposited in different locations in order to germinate and grow. Each of the steps leading to “recruitment”, i.e. the survival of a seedling, can be affected by its

immediate environment in the short-term, and of course by climate change over time. But since frugivores, such as GHLTs, are the principal mechanisms that plants rely on for “migrating”, frugivorous fauna is extremely important for forest regeneration and maintenance in the tropics.

The plant-animal interaction which is so important in the tropics is not yet featured in models trying to understand climate change impacts on vegetation, so my research is trying to integrate data collected in the field into a dispersal module that communicates with the main DVM.

The GHLT group that I worked with is located in Colônia da Una, Bahia, Brazil. Since the area is quite depleted of its frugivore community, a reality that is common in the Brazilian Atlantic Forest (BAF), trees with larger seed sizes that cannot be easily swallowed or spat are at a disadvantage for dispersion. Conversely, smaller-seeded



Photo of *in-situ* germination cage, with defecated seeds collected from GHLTs, and two controls (with pulp and without pulp).

trees have less risks as smaller bodied frugivores are still able to consume and disperse their seeds in a defaunated context, so my research focused on the dispersal patterns of the Pourouma genus, which is in the largest seed size range that the GHLTs can swallow and defecate, though there are other species (e.g. Virola genus, Manilkara genus, etc.) whose pulp is consumed, but the seeds are not.



GHLTs, one in bromeliad, one stopped.

Previous studies have shown average dispersal distances to be around 100m from the parent tree, though many times, defecated seeds do not even reach the ground, because of the foraging behaviours. Therefore, several parameters influence the success of germination, starting from fruit production (number of fruits, and therefore seeds produced by a tree), consumption (number of individuals of different taxa that consume fruits and their respective seed handling behaviours), dispersion (distance from the parent tree where a seed is deposited), and finally predation (seeds and or shoots that are predated upon), besides physical and chemical factors such as precipitation, sunlight, soil ph. etc.

The variables mentioned above were collected using different methods in the field to obtain an idea of "probability of germination and survival after one year" of seeds from the Pourouma genus, considering the effects of passage through the digestive tract, habitat, and sunlight as variables that influence germination.

These data are currently being analysed, though preliminary results suggest that rainfall patterns may be extremely important for germination and survival (proportion of seeds that germinated and stayed alive could be linked to soil humidity, i.e. rainfall, though the statistical analyses are yet to be conducted to determine the significance).

Once the field data are analysed, they will be incorporated into a seed dispersal module that interacts with the DVM to understand whether or not the monkeys could help the trees migrate to climate-appropriate zones under various scenarios. I will be working in the RCP4.5 and RCP8.5 scenarios as described in the IPCC's 5th assessment report, for a subset of the 33 general circulation models.

Stay tuned, as the results are available and analysed, I hope to share more with the community! I would also like to express my thanks to the LTBF for their generosity and interest in my project.



How forest corridors can save the black lion tamarins

Gabriela Cabral Rezende

Guaranteeing integrated habitat is a key factor for long-term species conservation. Because the black lion tamarin's main threat is habitat loss and fragmentation, this factor has been a concern for the Black Lion Tamarin Conservation Program since the early 1990s.

The black lion tamarin (*Leontopithecus chrysopygus*) is the only primate species endemic to the Sao Paulo state. This state has historically suffered from forest devastation since the first colonizers arrived, on the early 1500s. However, most of its Atlantic forest has been cut during the 20th century. Today, there is less than 14% of the native vegetation remaining in the state, while for the Interior Atlantic Forest (also named tropical

semideciduous forest) there is about 6.5% left. It is exactly in this type of forest that the endangered black lion tamarin lives. Its population is estimated in 1,500 individuals living in about 20 widely separated forest patches, all of them within the area belonging to the Rio Paranapanema's watershed (Figure 1).

A successful approach IPÊ (Instituto de Pesquisas Ecológicas) has adopted to increase the habitat available for the species is restoration. Through planted corridors we are reconnecting the forest patches in order to increase gene flow among populations.

For this we aim at the environmental liabilities of the

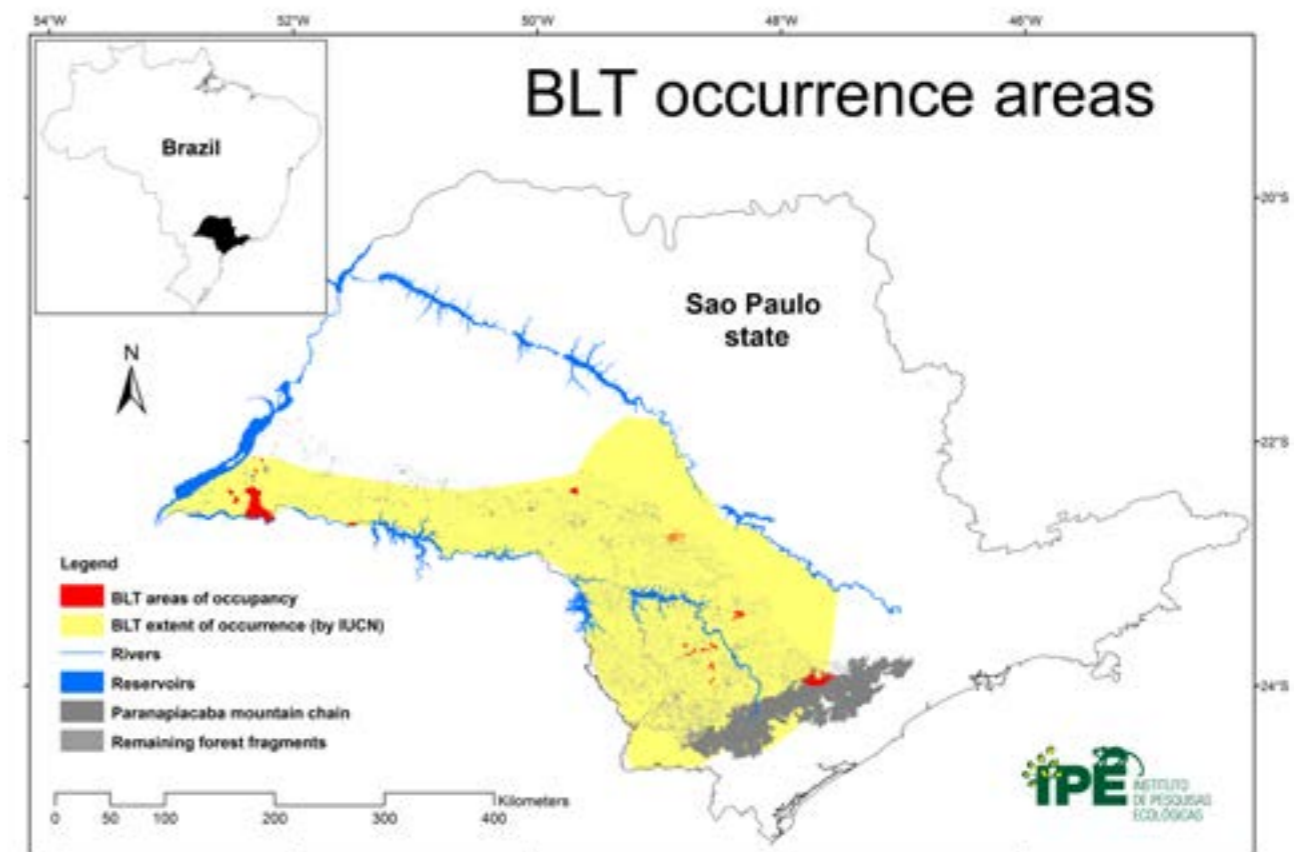


Figure 1. Sao Paulo state map highlighting the historical distribution range of the black lion tamarin (yellow) and the fragments where the species is currently known to occur (red).



Figure 2. a) Fazenda Rosanela, at the right margin of Rio Paranapanema (Morro do Diabo State Park in the background) in 2010; b) Fazenda Rosanela, same view as in (a), in 2012; c) Other piece of the tree corridor, planted in 2004, in Fazenda Rosanela, connecting two fragments (the planted area is in light green, as opposed to the dark green of the mature forest in the fragments).

private properties, which total an area of approx. 70,000ha in Pontal that, according to the Brazilian Forest Code, must be restored with native species. Based on this information, IPÊ has elaborated the Dream Map of Pontal do Paranapanema, which indicates the priority areas for forest restoration within the region, in order to establish forest corridors between the fragments and reconnect the black lion tamarin populations.

The “Corridors of Atlantic Forest” project started to plant its first seedlings in 2002. After all those years the result is the largest planted tree corridor in Brazil, a 700-hectare link between the two main remnants of Atlantic Forest in the Pontal do Paranapanema: the Black Lion Tamarin Ecological Station and the Morro do Diabo State Park (Figure 2).

This main corridor was finished in 2012, but considering the 70,000ha of liabilities, the project has continued planting other smaller corridors and stepping stones to reconnect the landscape. Until 2015, more than 1,000ha has been restored and our annual target is of at least 100ha restored, every year. There is still a lot of areas to be restored... reminding that 70,000ha is enough to harbour a population of more than 3,000 tamarins!

The next challenge

Based in our experience in Pontal do Paranapanema, recently we started working on a map of priority areas for protection and restoration, considering the populations in the southeast part of Sao Paulo (Figure 3). The main objective of it is to establish a second viable population for the species, by reconnecting the main forest fragments where black lion tamarins occur, to the Paranapiacaba Ecological Continuum, a massive mountain chain still covered by Atlantic forest.

The restoration areas are initially focused on riparian forests that need to be restored, according to the Brazilian Forest Code. Three main rivers were chosen for this: Paranapiacaba, Guareí and Apiaí-Mirim. Our mapping results showed that these three rivers were supposed to have 4,392 hectares of riparian forest, but there is an environmental liability of 1,090 hectares to be restored in order to reconnect the fragments and comply with the law.

This goal became more meaningful after two recent findings. The first is the record of a group of black lion tamarins in the northern region of Carlos Botelho State Park (Rodrigues et al. 2014). This park (shown on Figure 3) is located in the Paranapiacaba Ecological Continuum, very close to the springhead of Paranapanema river, one

of the rivers we have focused our recovery plan. This is not the first record of black lion tamarins within this mountain chain (Lima et al. 2003; Röhe et al. 2003), but it has shifted southward the known distribution limit of the species there.

The second finding is that a recent study of niche modelling-based predictions for climate change has shown that the black lion tamarin would lose most of the current viable habitat within its range due to latitudinal shift in temperature in the next 40 years (Meyer et al. 2014). But the most suitable area for the species within its distribution range would be the Paranapiacaba Ecological Continuum. Those two findings, associated with the estimated population size for the fragments in the Upper Paranapanema watershed that would correspond to the second largest population if connected (Valladares-Padua & Martins 2008), give us hope that, if the landscape of the region is well managed, it is possible to establish a

second viable population of black lion tamarins. Because restoring the forest is a long-term strategy, research and management of black lion tamarin populations must continue to ensure that the small populations are healthy and viable while they are not effectively reconnected. For this, a short-term goal of the Program is to update and implement the BLT Metapopulation Management Plan, considering the new data from latest researches. The black lion tamarin’s tale, as well as of the other lion tamarins’ and many other species that have conservation projects underway, has proved one more time that saving species takes time and requires long-term commitment. With a connected landscape and integrative approach, uniting research with conservation and environmental education, we hope to construct a stable scenario for the black lion tamarins.

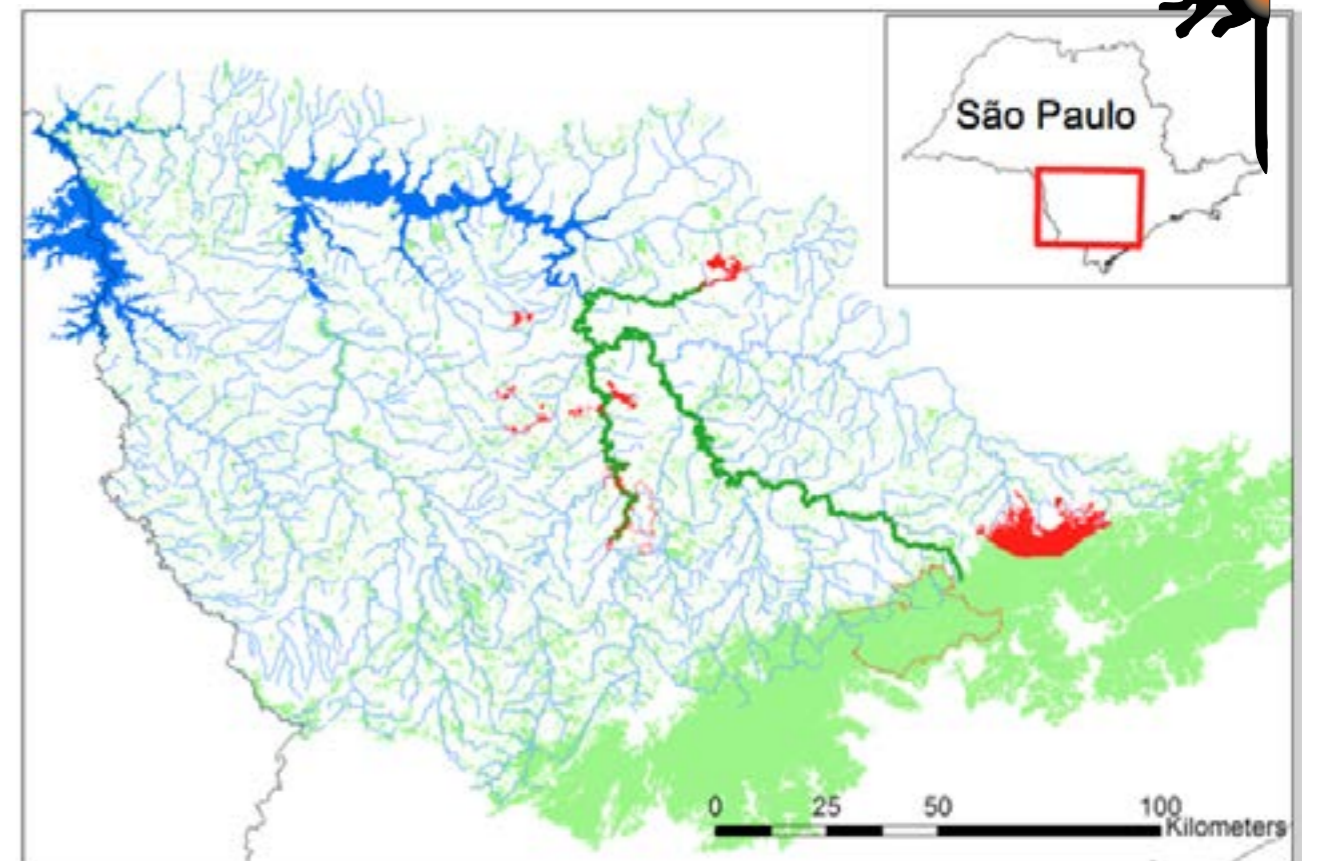


Figure 3. The Upper Paranapanema watershed, in Sao Paulo, with its system of streams, rivers and dams (in blue). The fragments where we can find black lion tamarins are filled in red, while the protected areas are contoured in red. The three rivers where we are focusing our restoration plan are highlighted in dark green: Paranapiacaba (middle), Guareí (right) and Apiaí-Mirim (left). The remaining forest is in light green. Attention should be called to the Paranapiacaba Ecological Continuum the forest that occupies the southeast area of the map.

Updates from the BLT Conservation Program in Pontal do Paranapanema (2014-2015)

Gabriela Cabral Rezende



The Black Lion Tamarin Conservation Program, developed by IPÊ (Instituto de Pesquisas Ecológicas), has officially started its activities in 1984 in the Pontal do Paranapanema, the westernmost region of São Paulo state. Over three decades, it has been building up a successful integrated approach based on the experience acquired by IPÊ's staff while living in the region and working with the species and the local communities. The strategies include applied conservation research and in situ metapopulation management, the creation of protected areas, habitat restoration, landscape connectivity improvement, and community involvement through environmental education and sustainable alternatives of income generation. In this context, our main goal is to guarantee self-sustaining and viable populations of black lion tamarin living in a wider, connected and protected habitat, and having the local

communities involved in the species conservation.

The year of 2014 was very special for the black lion tamarin, considering that its Conservation Program was celebrating its 30 years. Some milestones we can highlight for this year are (1) the black lion tamarin being declared by the state governor the symbol species for wildlife conservation of São Paulo state and also part of its Natural Heritage; and (2) the release of the book "Black lion tamarin: the successful history of conservation of a threatened species" (in Portuguese, but in the process of being translated to English), noting all the events, strategies and people involved in the conservation of the species over the years.

In 2015, the activities continue in full swing. The field team has focused its research in the small populations living in the four fragments of the region (Figure 1). The main objective is to guarantee healthy and viable populations

Forest Fragments in Pontal do Paranapanema

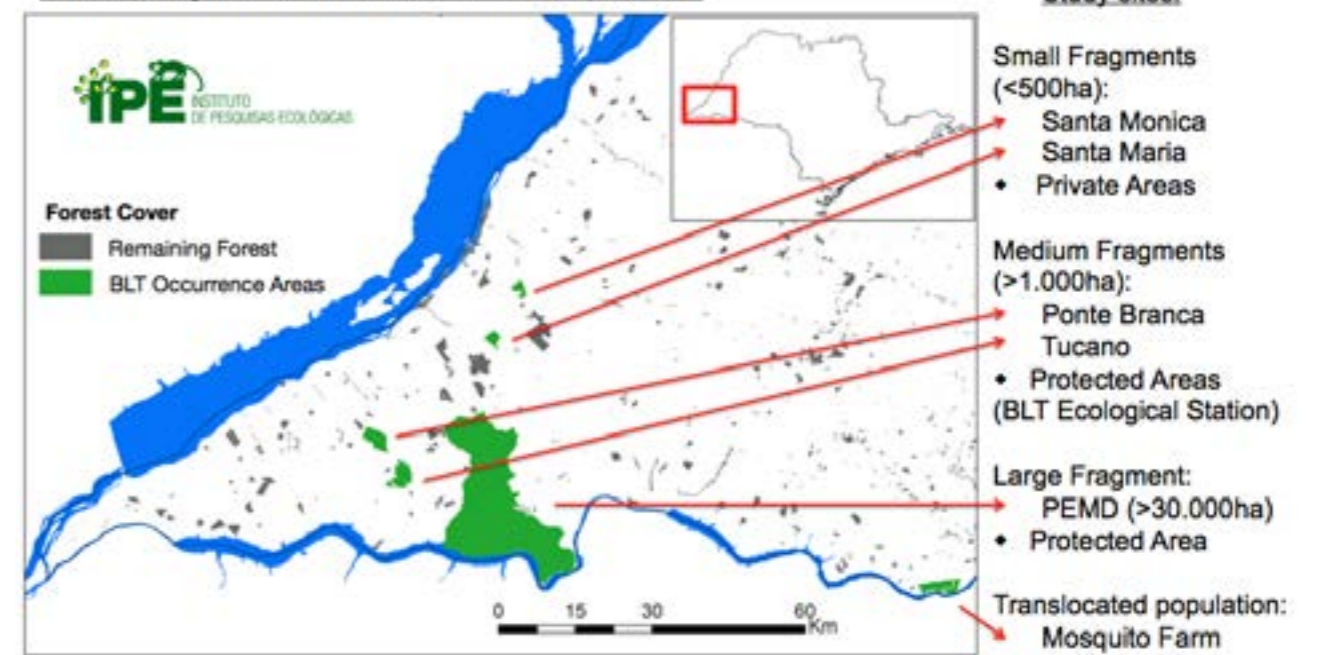


Figure 1. Fragments in Pontal do Paranapanema where the research with the black lion tamarin takes place.

within the fragments while the restoration activities take place to reconnect them. The research in demography, ecology and genetics aims to provide the groundwork for updating the BLT Metapopulation Management Plan. The team is also working in the main fragment of the region: the Morro do Diabo State Park, a 35,000-hectare forest that harbours the only viable population for the species. Besides working as a control group for the research in the small fragments, the research in the Park

aims to study the use of planted corridors by the black lion tamarins.

A new research focus for 2016 is the assessment of the population translocated to the Mosquito Farm between 1995 and 2008. The data will help us to define management goals for this population in the BLT Metapopulation Management Plan. The good news is that in a recent visit to the area, the team could record two babies (~6 months old) in the group translocated in 2008 (Figure 2). New births are a great incentive for a new demographic assessment of that population.

Community involvement is another key component of our conservation work. In 2015-2016, we are expanding our Environmental Education activities to the four municipalities where the protected areas harbouring black lion tamarins in Pontal are (the Morro do Diabo State Park and the BLT Ecological Station). This means about 100 teachers of public schools being trained to develop educational activities that disseminate information on the species, and hundreds of kids getting to know the black lion tamarins, the Atlantic Forest and the importance of conserving them, through talks, workshops, exhibitions and guided tours to the fragments.

An important event in 2015 was the "VI Econegociação:



Figure 2. One of the babies that were recorded in the group translocated in 2008 to Mosquito Farm, from Buri. Photo was taken in October 2015. ©Gabriela Cabral Rezende



Figure 3. Some of the participants (from the government, civil society and business sectors) in the follow-up meeting of the IV Econegeciação in Pontal do Paranapanema, in June 2015.

Um Pontal bom para todos". This is a participative workshop, promoted by IPÊ, to plan the actions for the sustainable development of Pontal for the next five years. More than 100 key stakeholders were present in the workshop in March and the follow-up meeting in June (Figure 3).

The "Econegeciações" and the Environmental Education activities help us raising awareness and support from the local community. The result of it is the increasing number of landowners planting small patches of forest in their properties. These patches are established as Agroforestry Systems (AFS), usually focused in the production of coffee, shaded by native trees. Besides generating income to the owners, the AFS promote the landscape connectivity, working as stepping-stones, or islands of biodiversity scattered throughout the landscape. For example, in 2015, 50ha of AFS were planted in the settlements of Pontal. The restoration of biodiversity is evident... and the benefits to the local community too!

To finish this brief highlight of accomplishments in 2014-2015, we would like to mention the creation of the Commission for the Protection of Primates in the State of São Paulo (Pró-Primatas Commission) by the São Paulo state government, formed by 12 members among NGOs, government and academy, including IPÊ. Through regular meetings, this group has developed and implemented the Emergency Plan for the Conservation of Primates in the State of São Paulo. These meetings has been working as an open channel of communication with the government and allowed the data from our field research to reach

decision makers and truly support the development of policies.

A proof that we are on the right way is that in May 2015 the Black Lion Tamarin Conservation Program received the National Award for Biodiversity (Figure 4) from the Brazilian Ministry of the Environment, as the best conservation initiative in Brazil for the category NGO (among more than 800 candidates). Such recognitions motivate us to keep fighting for what we believe. But the history of the species has shown that saving it is possible only with the support of many people, nationally and internationally. Be part of this group!

Together we can do much more!



Figure 4. Suzana Padua (IPÊ's president) and Gabriela Rezende (Coordinator of the BLT Program) during the ceremony of the National Award for Biodiversity.

Institutional Participation in the GLT Reintroduction Program.

Benjamin B. Beck and Jennifer Mickelberg

Forty-three institutions, including 41 zoos, one primate center, and one university research colony, were home to the 146 captive-born golden lion tamarins that were reintroduced to the wild in Brazil between 1984 and 2001. Some were born at and spent their whole lives in one institution, and some were transferred once or twice before entering the reintroduction program. An additional 30 GLTs entered the program but, for various reasons (e.g. health problems that were discovered during quarantine), were not reintroduced.

These institutions were located in eight countries on three continents, making this reintroduction arguably the most collaborative, international conservation effort in history. And of course the reintroduction was just one component of the overall GLT conservation effort that has involved the participation and support of many other organizations.

The institutions that participated in the reintroduction (some of which no longer exist) were:

Apenheul Primate Park (Apeldoorn, Netherlands), Audubon Park & Zoological Garden (New Orleans, Louisiana), Belfast Zoological Gardens (Belfast, Ireland), Brandywine Zoo (Wilmington, Delaware), Chicago Zoological Society/Brookfield Zoo (Brookfield, Illinois), Cohanzik Zoo (Bridgeton, New Jersey), Denver Zoological Society (Denver, Colorado), Durrell Wildlife Conservation Trust (Jersey, Channel Islands), El Paso Zoo (El Paso, Texas), Fort Worth Zoo (Fort Worth, Texas), Henry Doorley Zoo (Omaha, Nebraska), Hogle Zoological Gardens (Salt Lake City, Utah), Honolulu Zoo (Honolulu, Hawaii), Kings, Island (Mason), Lincoln Children's Zoo (Omaha, Nebraska),

Los Angeles Zoo (Los Angeles, California), Marwell Zoological Park (Winchester, U.K.), Mill Mountain Zoo (Roanoke, Virginia), Milwaukee County Zoological Gardens (Milwaukee, Wisconsin), Monkey Jungle (Miami, Florida), Oklahoma City Zoo (Oklahoma City, Oklahoma), Paignton Zoo (Paignton, U.K.), Penscynor Wildlife Park (Neath, U.K.), Potawatomi Zoo (South Bend, Indiana), Rio de Janeiro Primate Center (Guapimirim, Brazil), Riverbanks Zoo (Columbia, South Carolina), San Antonio Zoological Gardens & Aquarium (San Antonio, Texas), Sedgwick County Zoo (Wichita, Kansas), Skansen-Akvariet (Stockholm, Sweden), Smithsonian National Zoological Park (Washington, D.C.), Sunset Zoo (Manhattan, Kansas), Tulsa Zoo (Tulsa, Oklahoma), University of Nebraska (Omaha, Nebraska), Washington Park Zoo (Portland, Oregon), Wyld Court (U.K.), Zoo Atlanta (Atlanta, Georgia), Zoo Emmen (Emmen, Netherlands), Zoo Frankfurt (Frankfurt, Germany), Zoo La Palmyre (Les Mathes, France), Zoo Wuppertal (Wuppertal, Germany), Zoologischer Garten Basel (Basel, Switzerland), and Zoogischer Garten Köln (Cologne, Germany).

Quarantine was provided by the Smithsonian National Zoo, Rio de Janeiro Primate Center, Chicago Zoological Society/Brookfield Zoo, Apeldoorn Primate Park, and Columbus Zoo.

Major funding for the reintroduction was provided by the Durrell Wildlife Conservation Trust, Smithsonian National Zoo, and Zoologischer Garten Frankfurt.

In the table below (table 1), the reintroduced GLTs are identified by their four-digit studbook number. The

studbook number is a specific identifier that is assigned to each captive-born GLT and to many wild-born descendants of the reintroduced GLTs and many wild GLTs as well. The studbook number is tattooed on the inner thigh of many of these GLTs for positive life-long identification. The higher the number, the more recently the GLT studbook keeper has assigned it. The studbook also identifies the parents of each GLT, which allows their genetic lineages to be traced.

There is no current need to reintroduce additional zoo-born GLTs to the wild. There are currently more than 3,000 GLTs living in the wild, of which approximately 1,000 are descendants of the zoo-born reintroduced animals. The international captive population is well

represented genetically in the Brazilian wild population, although interbreeding in the wild is somewhat restricted by habitat fragmentation. AMLD is conducting targeted translocations (Figure 1.) and is constructing forest corridors to allow all of the GLTs to move freely and interbreed within the available habitat.

It is critical to maintain a genetically, demographically, medically, and behaviorally healthy zoo population in the event that the wild population is dramatically reduced by, for example, a disease epidemic or environmental catastrophe. The reintroduction technique is tested and documented, and zoo GLTs could again be reintroduced with high success rates.

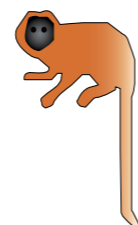


Figure 1. In 2011, AMLD translocated GLT “Devra”, descendant of zoo-born tamarins, into Poço das Antas Reserve. In December 2015, Devra, the adult in this picture, and a male native to the Reserve produced the infant in this picture. Photographer: Andreia Martins, Associação Mico-Leão-Dourado.

Table 1. Column 1 lists the names of the 43 Institutions, in alphabetical order. Column 2 is the studbook numbers of the GLTs that were born in each institution. Column 3 is the studbook numbers of the GLTs that were transferred after birth to each institution. Column 4 is the studbook numbers of the GLTs that were sent from each institution to pre-shipment quarantine. This does not include the pre-shipment quarantine itself, which occurred at the Smithsonian National Zoo, Rio de Janeiro Primate Center, Brookfield, Apeldoorn, or the Columbus Zoo.

| Zoo | Birth | Between Birth and Reintroduction | Last Stop Prior to Reintroduction |
|--|---|----------------------------------|--|
| Apenheul Primate Park (Apeldoorn, Netherlands) | 2068, 2069, 2194, 2195 | 1375 | 1375, 2068, 2069, 2194, 2195 |
| Audubon Park & Zoological Garden (New Orleans, Louisiana) | 1007, 1356, 1357, 1399, 1400, 1447, 2371, 2372 | 2032, 1722 | 1007, 554, 1356, 1357, 1399, 1400, 1447, 2032, 1722, 2371, 2372 |
| Belfast Zoological Gardens (Belfast, Ireland) | 1375 | | |
| Brandywine Zoo (Wilmington, Delaware) | 2236 | | 2236 |
| Chicago Zoological Society/Brookfield Zoo (Brookfield, Illinois) | 554, 1097, 1111, 2031, 2155, 2154, 1702, 2032, 2998, 3044, 3045, 3100, 1110 | 2430, 2668 | 1111, 2031, 2155, 2154, 2430, 2668, 2998, 3044, 3045, 3100, 1494, 1110 |
| Cohanzick Zoo (Bridgeton, New Jersey) | | 1992 | |
| Denver Zoological Foundation (Denver, Colorado) | 1154 | | |
| Durrell Wildlife Conservation Trust (Jersey, Channel Islands) | 868, 1542, 1672, 1837, 1397, 1706 | 872 | 868, 872, 1542, 1672, 1837 |
| El Paso Zoo (El Paso, Texas) | | 1697 | 1697 |
| Fort Worth Zoo (Fort Worth, Texas) | 1721, 1722, 2414 | | 2414 |
| Henry Doorly Zoo (Omaha, Nebraskas) | 2436 | | |
| Hogle Zoological Gardens (Salt Lake City, Utah) | | 1992 | |
| Honolulu Zoo (Honolulu, Hawaii) | 2326, 2218 | 2326 | 2218 |
| Kings Island (Mason, Ohio) | 1103, 1268, 1267, 1178, 1179, 1697 | 705 | 705, 1103, 1268, 1267, 1178, 1179 |
| Lincoln Children’s Zoo (Lincoln, Nebraska) | 1840, 1841, 1602, 2091, 2092, 1992 | 1013, 1079 | 1013, 1079, 1840, 1841, 2091, 2092 |
| Los Angeles Zoo (Los Angeles, California) | 1290, 1936, 1937, 2034, 2035, 738 | 740 | 740, 1290, 1936, 1937, 2034, 2035 |
| Marwell Zoological Park (Winchester, U.K.) | 1767, 2100, 2200, 2129, 1620, 2199 | | 1767, 2100, 2200, 2129, 2199 |
| Mill Mountain Zoo (Roanoke, Virginia) | 2668 | | |
| Milwaukee County Zoological Gardens (Milwaukee, Wisconsin) | | 1702 | 1702 |
| Monkey Jungle (Miami, Florida) | 808 | | |
| Oklahoma City Zoo (Oklahoma City, Oklahoma) | 1079, 872 | | |
| Paignton Zoo (Paignton, U.K.) | 2430 | | |
| Penscynor Wildlife Park (Neath, U.K.) | 1710, 1870, 1871 | 1154, 1164 | 1154, 1164, 1710, 1870, 1871 |

| | | | |
|--|--|------------------------|---|
| Potawatomi Zoo (South Bend, Indiana) | | 1985 | |
| Rio de Janeiro Primate Center (Guapimirim, Brazil) | 1379, 1380, 1686, 1772, 1901, 1691, 1773, 2047, 2048, 2116, 2203 | | 1379, 1380, 1686, 1772, 1901, 1691, 1773, 2047, 2048, 2116, 2203 |
| Riverbanks Zoo (Columbia, South Carolina) | 1490, 1491, 1745, 1746, 1855, 1156, 1432, 2023, 2061, 2167, 2168, 1450, 2407, 1985, 1632 | 990, 1086 | 990, 1086, 1490, 1491, 1745, 1746, 1855, 1432, 2023, 2061, 2167, 2168, 1632 |
| San Antonio Zoological Gardens & Aquarium (San Antonio, Texas) | 1164 | 657 | 657 |
| Sedgwick County Zoo (Wichita, Kansas) | 1248, 1249, 1384 | 808 | 808, 1248, 1249, 1384 |
| Skansen-Akvariet (Stockholm, Sweden) | 1817, 1972, 1613, 2342, 2343, 2315, 2316, 2317 | | 1817, 1972, 1613, 2342, 2343, 2315, 2316, 2317 |
| Smithsonian National Zoological Park (Washington, D.C.) | 705, 1333, 800, 740, 657, 1041, 990, 1086, 1645, 1844, 1193, 1192, 1494, 1918 | 554, | 1333, 800, 1041, 1645, 1844, 1992 |
| Sunset Zoo (Manhattan, Kansas) | | 2436, 2407 | |
| Tulsa Zoo (Tulsa, Oklahoma) | 1013, 1313 | | |
| University of Nebraska (Omaha, Nebraska) | 1726, 1910, 1911, 1949 | 1156, 1097, 1918 | 1156, 1097, 1726, 1910, 1911, 1949 |
| Washington Park Zoo (Portland, Oregon) | | | 1918 |
| Woodland Park Zoo (Seattle, Washington) | 1656, 1657, 1789 | 738, 1313 | 738, 1313, 1656, 1657, 1789 |
| Wyld Court | | 2129 | |
| Zoo Atlanta (Atlanta, Georgia) | 2718, 2719 | 2436, 2407, 2326, 2218 | 2436, 2407, 2718, 2719, 1985, 2326 |
| Zoo Emmen (Emmen, Netherlands) | 2191, 2283, 2324, 2323, 2190 | 1602, 1450 | 1602, 1450, 2191, 2283, 2324, 2323, 2190 |
| Zoo Frankfurt (Frankfurt, Germany) | 1759, 1953, 1407 | | 1759, 1953, |
| Zoo La Palmyre (Les Mathes, France) | 2009 | 1397, 1683, 2009 | 1397, 1683, 2009 |
| Zoo Wuppertal (Wuppertal, Germany) | 2211, 2320, 2321, 2368, 2369 | | 1721, 2211, 2320, 2321, 2368, 2369 |
| Zoologischer Garten Basel (Basel, Switzerland) | 2145, 2405, 2249, 2406, 2272 | 1706, 1192 | 1706, 1192, 2145, 2405, 2249, 2406, 2272 |
| Zoologischer Garten Köln (Cologne, Germany) | 1683, 1908, 2182, 2185 | 1193, 1407 | 1193, 1407, 1908, 2182, 2185 |



Lion Tamarins of Brazil Fund

- an update

Bengt Holst

From July 2014 to December 2015 the Lion Tamarins of Brazil Fund received a total of 80.500 US\$. The money was received from 12 different donors from Europe and the United States. 10.000 US\$ was earmarked to specific species in the framework of “adopt a group” arrangements – arrangements where each zoo contributes an amount of at least 5.000 US\$ a year to a specific conservation programme and receives in exchange regular reports from the field that they can use in their conservation interpretation activities in the zoo. The reports are very popular with the zoo visitors and provide a good feeling of what is going on in the forest where the Lion Tamarins live. From the field project point of view the money is essential for their activities, and they can use the zoos as windows to the outer world – exactly in the same way that the zoos can use the field projects as a window to nature. We have thus created a win-win situation that we can all be proud of, and I can only as I did in the last volume of Tamarin Tales recommend our supporters to enter such arrangements. I will still be happy to facilitate such a process if wanted.

During the same period an amount of 72.000 US\$ has been awarded to different Lion Tamarin field projects in Brazil in accordance with the decision made by the International Committee for Conservation and Management (ICCM) of the Lion Tamarin Species in 2005: “It is recommended that the present amount together with the current income is spent in support of the implementation of the new Conservation Action plan down to 50.000 US\$ within the next 5 years. Integrated projects in support of all four species have priority. The remaining 50.000 US\$ is to be kept as an “emergency fund” to be used in urgent matters only. In case an endowment fund can be established, the remaining amount after 5

years must be included in that fund.

Approved by the ICCM 14 June 2005”

I am happy to announce that there has been an increasing interest from potential donors

in the past period. This is not least due to the fact that we had the pleasure of having two of the main drivers behind the Golden Lion Tamarin and the Golden-headed Lion Tamarin programmes visiting Europe in autumn 2015. Jim and Lou Ann Dietz, the founding Directors and the present president of “Save the Golden Lion Tamarin” participated in the annual conference of the European Association of Zoos and Aquaria in September 2015 and gave several presentations about the development of the Lion Tamarin programmes as well as the status and future for the Golden Lion Tamarin conservation programme. The interest from the zoo audience was great, and part of this interest has since then resulted in requests about the Lion Tamarins of Brazil Fund.

Another important event was the AMLD (Golden Lion Tamarin Association) Strategic Planning workshop held in Poco das Antas in March 2015. The workshop resulted in the development of a new strategic action plan for the Golden Lion Tamarins and gave a very clear picture of what challenges we still have for the conservation of this species. One big challenge is the extension of Highway 101 that divides the distribution area of the Golden Lion Tamarins into two with nearly no natural exchange of



genes across the road. If this separation will persist in the future it will be very difficult to ensure a future for the Golden Lion Tamarin population. But if we succeed in establishing a number of corridors at the right places and with the right construction the future for the Lion Tamarins in the area looks quite promising. You can read more about this in one of the articles in this volume of Tamarin Tales.

In general the stories in this volume of Tamarin Tales are focusing on the projects that have received support from the fund during the past couple of years. I hope you will find the stories exciting and certainly worth supporting. I would thus also use this opportunity to thank all contributors during the years to make these and other projects possible. Together the many donors not only constitute the financial basis of the Lion Tamarins of Brazil Fund, but they are also a standing proof of the dedication of zoos to conservation of the four Lion Tamarin species. It is my sincere hope that the support will continue in the coming years. Conservation is a question of long term commitment, and a loyal group of supporters is the best one can wish for serious conservation projects. I thus want to thank all institutions and single persons cordially who have contributed to the Lion Tamarins of Brazil Fund during the reporting period. A special thank to those who have indicated to continue their valuable support also in the years to come. All contributions, big and small, are

most appreciated and are earmarked for field projects supporting Lion Tamarin conservation.

From July 2014 till the end of 2015 the following institutions have contributed to the Lion Tamarins of Brazil Fund:

Donations over \$5,000

Copenhagen Zoo
Dublin Zoo
Skansen Akvariet

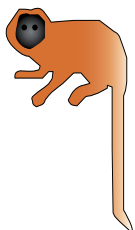
Donations \$500 to \$5,000

Brandywine Zoo
Friends of the Baton Rouge Zoo
La Vallée des Singes
Marie Byrèus
New Mexico Bio Park Society
Zoo la Palmyre

Donations less than \$500

Buffalo Zoological Gardens
Jerusalem Zoo
Plock Zoo

Bengt Holst, Copenhagen Zoo, co-custodian of the LTBF



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