BOLIVIAN BAT CONSERVATION AND COMMUNITY EDUCATION PROJECT

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INTRODUCTION

Bolivia is considered a country that holds a large percentage of the world’s biodiversity. Sadly, most of this huge biodiversity is still unknown and it is evident the lack of conservation projects. Bolivian bats (Chiroptera) represent one of the most specious mammalian groups, accounting for a third of all Bolivian mammal species. Recently, this animal group has gathered more attention from scientists and institutions that made an effort to increase the knowledge of Bolivian bats. Our project has been a key element to this effort, but we feel that there is still more to learn about this fascinating and beneficial group. New distributional records are accounted as new sites are surveyed, thus we are only beginning to understand the distribution of Bolivian bats. Knowledge of biology, ecology, and the present state of threats of almost all Bolivian bats remains poor. Furthermore, bats play an undervalued role in forest regeneration, pollinating and dispersing many plant species and are thus potentially important to local human populations, as these plants are a source for commercial timber, traditional housing material, foods and medicines. These important relationships are poorly understood and little appreciated and our project is the only one that attempts to educate people (adults and children as well) in rural areas about the important role that bats play in the ecosystem. The second Rufford Small Grant allowed us to survey the bat diversity in areas that have never been previously studied and represent high priority sites for bats, such as roosts and nurseries, or sites known (or suspected) to have very high bat diversity. In each area surveyed, we contacted the rural communities and developed a threats assessment and educational workshops.

OBJECTIVES

- Conduct a series of bat surveys, using different capture methods and acoustic survey techniques, at 10 important areas for bat conservation in Bolivia that have never been previously studied.
- Contact the communities (campesino and indigenous) that live near these areas and through observations and interviews with villagers, determine the real or potential threats towards bats.
- At the end of the bat survey period, develop an educational workshop with the villagers, focusing on the bat community found in the survey, particularly in the specific threats observed. The workshops will be aimed at working against the perception that all bats are bad and demonstrating the importance of bats in forest regeneration and pollination.
METHODS

Phase 1: Choosing the areas
The data presented in Anderson (1997) was merged with other published studies that followed to develop a Bolivian bat database (Aguirre et al. 2003), which is available on request. Using this information, we determined the bat research gaps throughout Bolivia. Additionally, we consulted other biologists who work across the country, and they recommended interesting habitats, high diversity or roost sites. Finally, some of the sites where located in areas that we sought to survey a long time ago, and only now we had the opportunity and the funds to do so. Transport was usually the most limiting item of our budget, so the sites chosen had to be accessible in most of the cases (areas 1, 3, 5, 6, 8). In two protected areas, the administration helped with some of the transport (areas 7, 10). Two survey sites were located in inaccessible areas (areas 2, 9).

Phase 2: Logistics
For each area the equipment, food, and transport for two people had to be prepared. The camping equipment included medical kit, tent, stoves, rug sacks, and personal items. The fieldwork material included AnaBat equipment (sometimes including laptop computer), mist nets (and sometimes poles), string, leather gloves, bags, headlamps and batteries, measuring equipment, field identification literature, data sheets and camera. The education material included enlarged photos of bats, big paper sheets, markers, and in some cases CD’s (bat documentary, power point presentations) and laptop computer. For each area we calculated a two-week fieldwork, with 12 nights of bat work, but sometimes this had to be arranged according to the accessibility of the area and/or bat diversity. We tried to avoid full moon nights, due to the apparent lunar phobia of bats.

Phase 3: Bat Survey
Mist nets for bat capture were deployed along trails, roads, streams, rivers, foraging sites, and near roosting sites. In most cases we used 60 meters of net opened for 6 hours, but sometimes this was not possible due to weather conditions and other factors. In roosting sites, we observed and photographed the colonies to determine the species and count individuals. In some cases we captured a few individuals using an entomological net. Free-flying non-phyllostomid bats were recorded using the AnaBat system, which also helped us locate foraging sites, where mist nets were

Map of Bolivia and its nine Departments showing the 10 areas surveyed in this project.
Mist nets were the main method for bat capture; they were deployed in strategic sites. Each bat was identified using keys and descriptions of Anderson (1997) and Emmons & Feer (1999), measured, sexed, weighed, and marked. We also registered time of capture and habitat type, reproductive information, fecal samples, and photos. Individuals that could not be identified in the field were collected; the specimens will be deposited in the Museo de Historia Natural Alcide d’Orbigny (Bolivia).

Phase 4: Education
The communities were usually contacted at the time of our arrival, where we asked their permission to work, explaining our activities and inviting them to the final workshop. If the survey site was near the community, we invited the people to observe our work; these occasions were useful to carry out the threats assessment. Educational workshops were also developed in schools in most cases. Enlarged photos of bats were used in all educational activities, and in some cases live bats were shown. In exceptional cases, in communities that had electricity and/or we had the support of other institutions, we used a data-display to show the photos and a documentary. Informative posters with the specific bat information recorded in each site was developed and sent to them at the end of the project. Additional educational material, such as posters and t-shirts of “The Bats of Bolivia” was also developed for distribution across the country.

Phase 5: Specimen identification and Data management
Cleaned skulls of the specimens collected where necessary in most of the cases for identification. The keys presented in literature were used (Anderson, 1997; Emmons and Feer, 1999; Gregorin & Taddei, 2002), as well as new species descriptions (Simmons, 1996; Simmons et al. 2002; Pacheco et al. 2004; Velazco, 2005) and the ‘Mammalian species’ series. We also found very useful the work published by Simmons & Voss (1998) and Barquez et al. (1999). All standard measurements that were taken during fieldwork were used for identification. Additionally, cranial measurements (as indicated by Simmons & Voss, 1998) and the morphology of skull and teeth were also taken into account. Once the specimens were identified, a Bolivian bat identification expert (Aideé Vargas, BIOTA) was consulted to assure the identification. In some cases, it was necessary to consult international experts: Dr. Daniel Brooks (The Houston Museum of Natural Science, U.S.) and César Bracamonte (Argentina). In other cases, we left some specimens subject to later revisions with experts. The summarized rough data is presented in this report (number of species, abundance, and acoustic information). Specific analysis will be developed for scientific articles and other presentations.
ACTIVITIES ACHIEVED

The project carried out bat surveys, threats assessment, and educational activities in ten areas across Bolivia. The work sites are located in seven of the nine Departments of Bolivia, in eight major Ecoregions, and nine Subecoregions. The altitude ranged from 158 to 3719 meters above sea level. In the following pages a description of the activities carried out in each area are shown with some relevant photographs of the work. Please note that the fieldwork was not carried out during the months of December 2006 and January 2007, due to the intense rain and flooding in most rural areas of Bolivia (due to ‘El Niño’).

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**AREA 1: LA VEGA**

**DATES:** August 21\textsuperscript{st} to September 2\textsuperscript{nd}, 2006

**BAT SURVEY:** The bat survey was carried out mainly in a site called La Vega, but we also briefly evaluated a small town nearby (Independencia). The effort employed was of 48 to 60 meters of mist net opened from 5 to 6 hours for 10 nights. A total of 26 bats of 4 species were captured; the most abundant were the vampire bats (1 species, 19 individuals), followed by the fruit-eating bats (1 species, 5 individuals). Acoustic recordings of the insectivores were also obtained from at least 7 species, increasing 6 additional species to the mist net survey. Some of the bats registered acoustically are very interesting reports for this habitat type, and one of these is a new record for the Department of Cochabamba.

**THREATS ASSESSMENT:** This is an area that is very perturbed and highly populated. Although the main activity is agriculture, there are many vampire bats that feed on the very few animals people have (mainly cows and pigs). This high rate of vampire attacks caused some deaths due to anemia, and also infections in the mammary glands of these animals. People consider bats in general to be harmful, and have the tendency of killing any bat in their reach. They have not planned vampire control activities in the past, and do not look for bat roosts to destroy them.

**EDUCATION:** The proximity of La Vega to the small town of Independencia allowed us to carry out an informative interview that was broadcasted through one of the main radio stations of the area. We also invited the people to participate in the educational workshop through an advertisement, which was emitted for four days. We also invited personally the main authorities of the area. Sadly, all of our efforts to summon the people were not enough, and the fact that the workshop was carried out in La Vega resulted in very few people who participated. During this workshop the vampire conflict was discussed, and the need of a solution was eminent. We recommended the villagers to apply a vampiricid in the wounds caused by vampire bats, and this would probably decrease the number of attacks. We also developed a plate showing the general bat information on one side, and the instructions for using a vampiricid on the other side. This plate was sent to the villagers, along with two samples of vampiricid tubes.

**PARTICULAR CHALLENGES FACED:** Most of the people that lived in La Vega migrated to the small town of Independencia; this is why it was very difficult to carry out the workshop. We planned to come back to Independencia to carry out other educational activities, but the time and budget didn’t allow us to do this.
AREA 2: PAMPA GRANDE (ex-protected area Altamachi)  

DATES: August 13th to 19th (1st attempt: not successful)  
September 18th to 29th, 2006

BAT SURVEY: One site was sampled located in Pampa Grande River, with an effort of 30 meters of mist net opened from 5 to 6 hours for 6 nights. A total of 81 bats of 11 species were captured. The most abundant were the fruit-eating bats (4 species, 68 individuals), followed by the insectivores (4 species, 12 individuals). One species of a nectar-eating bat was also registered. Acoustic recordings were also obtained from at least 7 species, increasing 6 additional species to the mist net survey. One of the fruit-eating bats captured is a recently described species (*Carollia manu*) that was only known from one locality in Bolivia; our account is a new departmental record, and it is the first specimen in a Bolivian collection. A scientific article with this information is currently being prepared. Other two species constitute new records for the Department of Cochabamba, one of which could not be identified and it’s subject to further revision, it might constitute a new record for Bolivia.

THREATS ASSESSMENT: Only two families live in Pampa Grande; other villagers have some crops and animals in Pampa Grande but they live in Inkakasani and Jatun Inkakasani, two high-altitude communities that are three days away from the survey site. The people who live in this area do not want any strangers or outsiders to enter, so all of these factors made it very difficult to talk to the people about bats, and find out which threats could be present in the area. Nevertheless, I believe that due to difficult access, the area of Pampa Grande is naturally protected, and thus bats probably do not face major threats.

EDUCATION: We have worked in the field with three young guides from Inkakasani who were trained in all aspects of bat research used in this project, and they observed photos and live bats. An educational workshop with the adults of the communities of Inkakasani and Jatun Inkakasani was definitely out of the question, they did not want us there. Instead, we concentrated our efforts in the school of Inkakasani, where we carried out 5 educational sessions with 120 students, from 3rd to 8th grades, most of which have never seen bats (all the information presented was new to them). It was very encouraging to be accepted by the children and hopefully everything they learned will be transmitted to their parents.

PARTICULAR CHALLENGES FACED: The first time we tried to enter the area, the villagers did not agree. Afterwards, we tried again talking directly to the Head of Pampa Grande and he allowed us to work, but after our research, the communities of Inkakasani decided to replace all the Heads of the Villages, and never allow strangers to come in the area again. Also, the site is difficult to access, it took us six days to move to and from the site, which reduced the nights of work. This area is very interesting for further biological research, but the social aspect needs to be worked first, maybe with other specialized professionals (such as sociologists).
**AREA 3: TOTORENDA**

**DATES**: October 17th to November 4th, 2006

**BAT SURVEY**: The project’s activities were carried out in two sites (La Montaña Private Property, Totorenda Village). Mist nets were used for bat capture in La Montaña, and education activities were carried out in Totorenda Village. The effort employed was of 60 meters of mist net opened from 4 to 6 hours for 12 nights. A total of 95 bats of 7 species were captured, the most abundant were the fruit-eating bats (3 species, 79 individuals), followed by the insectivores (2 species, 12 individuals), the nectar-eating bats (1 species, 3 individuals), and vampire bat (1 species, 1 individual). Three species constitute new records for the Department of Chuquisaca. Acoustic recordings of the insectivores were also obtained from at least 8 species, increasing 6 additional species to the mist net survey.

**THREATS ASSESSMENT**: Totorenda has many private properties where the main activity is raising cattle. In La Montaña, the owner designated some areas for cattle and other forest areas for conservation. We have observed that the habitat is well conserved in this area, and that bats do not face many threats. Vampire bats are in low numbers and they do not cause major conflict. The community has two distinct components, the owners of the private properties that usually do not live in Totorenda; and the native guarani, who usually work for the owners and live there. The guarani know very little about bats, they usually think that there is only one type of bat who feed on blood, but in general they were very insecure about their knowledge and did not want to share it.

**EDUCATION**: We had a meeting with the community the day we arrived and invited them to the educational workshop. Apparently, the owners were not interested and did not come, but the guarani were very interested and 25 of them came to the workshop. They seem very enthusiastic about bats and our work. We also organized two educational sessions in Totorenda’s school, and around 90 students participated. Since the workshop with the children was carried out after the workshop with the adults, we observed that many children already knew all the information we were transmitting. This proved to us that the educational workshop is an event that families discuss, and that all information provided is shared among the members of each family.

**PARTICULAR CHALLENGES FACED**: In this area we did not face problems that could not be solved. Although we failed to get the owners of the private properties interested in the educational workshop, we hope to mend this with the education material.
### AREA 4: VILLA CONCEPCIÓN (TCO Moseten)

**DATES:** November 12th to 28th

**BAT SURVEY:** The project’s activities were carried out in two sites (San Antonio Forest, Concepción Village). The effort employed was of 54 meters of mist net opened from 4.5 to 6 hours for 11 nights. A total of 170 bats of 23 species were captured; the most abundant were the fruit-eating bats (16 species, 160 individuals), followed by the insectivores (3 species, 4 individuals), the nectar-eating bats, omnivores, carnivores and vampire bat (1 species each). Acoustic recordings of the insectivores were also obtained from at least 10 species, increasing 8 additional species to the mist net survey; among these species one is a new Departmental record for La Paz, and another is a new record for Bolivia. This is the area in which the project registered one of the highest bat diversity and abundance (32 species), with a very low number of vampire bats (1 individual of 1 species).

**THREATS ASSESSMENT:** The people in this area are aware that there are many different types of bats that feed on different items, this is something rarely observed in rural communities. Very often the people commented that they personally observed the bats feed on insects, fruit, or fish. In some cases they described roosting sites or feeding habits with a surprising detail. The vampire bat is also present in occasions, and usually wound the small farm animals they have (chickens and pigs). This is the main reason why people consider bats in general “harmful”, and they do not recognize the important role of insectivores and fruit-eating bats. However, when people encounter a bat roost, they usually leave it alone (except some children), and most of the houses in the village have bat roosts in their walls and ceilings. We have also observed that the forests surrounding Villa Concepción are very well conserved, with areas that are not currently being used for crops or commercial timber. This makes the Mosetenes area a strong candidate for further bat research and conservation activities.

**EDUCATION:** Three educational sessions were carried out in the only school of Villa Concepción, and all the children participated (around 170 students). These workshops were very encouraging because the children showed great knowledge of their environment and commented the encounters they had with bats. Some children confessed that they killed bats in the past, but recognized that this is wrong, and that they should not do this in the future. An additional bat workshop was carried out with the adults of the community (around 17 people). They also showed a great knowledge about bats and some of their feeding habits, although they recognized that there is a lot of additional information that they were not aware of, mainly concerning the ecological importance of bats. At the end of the workshop, we demonstrated the use of the AnaBat detector, and the villagers were very surprised of the great amount of bats that feed on insects constantly just above their homes.

**PARTICULAR CHALLENGES FACED:** The Native Land Community Mosetén (TCO) is a highly organized form of native communities (14 in total) coordinated by the Organisation of Moseten Indigenous Villages, OPIM. We planned to carry out our activities in a village with bat caves called Inicua, but this was not possible. Our aim is to return to work in Inicua and attempt a bat conservation workshop directly with the OPIM, so the information reaches all 14 communities in the TCO.
An interesting record of *Micronycteris* for the Dry Interandean Forests.

**AREA 5: ZURIMA**

**DATES**: February 14th to 19th, 2007

**BAT SURVEY**: The bat survey was carried out in only one site for a shorter period of time. Previous experiences in this habitat type, showed us that is not necessary a long period of survey to register most of the species. The mist nets were deployed near the plantations, in a hill, and we captured some bats near the street lights using the “net flicking” method. The effort employed was of 42 to 60 meters of mist net opened from 5 to 6 hours for 5 nights. A total of 11 bats of 7 species were captured; although we captured several species, all of these were in low numbers. One of these species (of the *Micronycteris* genus) is a very interesting account: it is the most southern report for the genus, and it is the first time is captured in the Dry Interandean Forests. Acoustic recordings of the insectivores were also obtained from at least 8 species, increasing 6 additional species to the mist net survey. These recordings showed us that insectivore bats are the most abundant in the area. Three of the species captured constitute new distributional records: two for the Department of Chuquisaca and one new record for Bolivia. Among the recorded species, 3 constitute new departmental records.

**THREATS ASSESSMENT**: The people in this area are unaware that different species of bats are present in their community, most of them believe that only the vampire bat is present, and therefore all bats are “harmful”. They also mentioned that bats and mice are the same animal, and confessed to be afraid of it. The Dry Interandean Valley is one of the most densely populated habitats across Bolivia, but this community is small compared with other valley communities. Children are the main threat to the fauna because one of their favorite games is to “hunt” every animal they see. Although we did not capture any vampire bat, the people told us that it is present where they keep their cows in a higher altitude site that we did not survey. Nevertheless, the villagers never attempted any activities for vampire control, and said that the very few roosts located in the houses were not disturbed.

**EDUCATION**: Four educational sessions were carried out in Zurima’s only school. The children and the teachers from the grades 4th to 8th participated (around 200 students). Most of the students participated actively and they seemed very curious about the information we shared. We also talked with many villagers and showed them the education material on a personal level. A lot of people came to us during the survey work, and in these occasions it was possible to show them the live bats we captured. Since it is a small village, the bat information was quickly disseminated and people were constantly asking us how many bats and which types we captured.

**PARTICULAR CHALLENGES FACED**: Most of the people in this community, including the village leader, were very distracted with the carnival festivities that was taken place, and they did not seem to be interested in our work when we arrived. After we visited the school, the children were the ones who disseminated the information and transmitted their interest to the adults.
## AREA 6: 6.1 ARQUILLOS 6.2 PAZÑA

**DATES:** 6.1 February 26th to March 1st, 2007 6.2 March 10th to 12th, 2007

**BAT SURVEY:** These two sites located in different regions of Bolivia are presented as one area due to the effort employed: one week in total. See ‘particular challenges faced’.

6.1 We observed two roosting sites containing only vampire bats, recorded bats with AnaBat (4 insectivorous species, one a new departmental record), and photographed an insectivorous bat eating moths in a corn garner. This event made us realize that a camcorder would be very useful to record such extraordinary events and show this to people in educational sessions.

6.2 This site is located in the Department of Oruro, the only in Bolivia that does not have any records of bats. Pazña is near Lake Poopó and there are thermal creeks in the site, which increased the possibility of finding bats. It was not possible to capture or record bats, probably due to the windy and very cold weather. We only observed one bat flying. One family helped us with the work, and they told us that they accidentally killed a bat with their car near the creeks. We convinced them to donate us the specimen, which is not only the first bat recorded for Oruro, but also a new record for Bolivia.

**THREATS ASSESSMENT:**

6.1 We talked mainly with children and some adults and they all told us that all bats are vampires, and therefore not beneficial to humans. The children showed us two known bat roosts, both with vampire bats. This assured people’s opinion of bats in general.

6.2 Similarly to other high-altitude sites, most people in Pazña are unaware that there are bats in their community. The people that we contacted were either indifferent or told us that we could find bats elsewhere. We found a person that had a desiccated bat, he did not tell us why he killed it and kept it with him all the time, but we suspect he used it for good luck or protection.

**EDUCATION:**

6.1 Since we did not have the permit of the Head of the village to work in the area, it was not possible to gather the adults for an educational workshop. Instead, we carried out the workshops in Arquillo’s only school, with around 65 students from 4th to 8th grades. Also, a few villagers of Arquillos observed the bat eating moths in a corn garner and proved first-hand that insectivorous bats are beneficial.

6.2 Education activities were carried out only at a personal level, with a few families we contacted; the indifference of the rest of the villagers did not allow us to do more. Due to the short period of work, it was not possible to contact the local school.

**PARTICULAR CHALLENGES FACED:**

6.1 We attempted to carry out our activities in the community of Arquillos, but the Head of the community demanded permits from the Mayor and other Heads of villages that lived in other communities. This was too problematic and due to other health issues, we decided to stop our work.

6.2 The weather conditions did not allow the capture of any live bats.
Umajalanta is the biggest known cave in Bolivia.

**AREA 7: CAMP UMAJALANTA (TOROTORO NATIONAL PARK)**

**DATES:** March 20th to 27th, 2007
May 29th to 31st, 2007

**BAT SURVEY:** The bat survey was carried out in Umajalanta Cave and surroundings. We observed and photographed bat colonies in three caves of the area, but we only found vampire bats roosting in them. However, some caves are very big and it is highly likely that other bats use them. For bat capture we used an effort of 36 meters of mist net opened for 6.5 hours for 6 nights. Eight bats of four species were captured, the most abundant were the vampire bats (4 individuals), followed by the insectivorous (2 species, 2 individuals) and frugivorous species (2 individuals). Acoustic recordings of the insectivores were also obtained from six species, five of which were not captured with mist nets, giving us a total of 9 species for the area. It is noteworthy that all captured bats are new records for Torotoro National Park and the Department of Potosí. One of these species is a new record for Bolivia: it is the second specimen of *Eptesicus chiriquinus* (the first record was captured in our project in Zurima). Of the recorded species, four constitute new departmental records.

**THREATS ASSESSMENT:** Similarly to other sites in the Dry Valleys, vampire bats are very abundant, and this creates conflict with the communities in the area. During the fieldwork we were in permanent contact with the park guards of Torotoro National Park. They were unaware that insectivorous bats were present in the area, and told us that vampire bats are usually a big problem, but the villagers respect bat roosts (caves) and they have not registered vandalism in the past years. When we talked to the villagers, they told us that they wish to solve the ‘vampire problem’, due to the damage this was causing in their farm animals.

**EDUCATION:** An educational workshop with representatives of 11 communities of the area was developed in the village of Torotoro. The administration of the Park invited the villagers for other activities and we took this opportunity to talk to them about bats. Around 20 people participated in the short workshop, and they were very thankful that we shared this information that they considered to be very important. Due to the interest of the villagers, the Torotoro National Park, and the tourist guides of Torotoro, we decided to carry out a 2-day workshop in May. This workshop gathered 18 tourist guides, two park guards, and one villager; they all received specific educational material, and also watched a documentary about bats. Short educational workshops were also carried out in the school of the main town, where around 150 students from 9th to 12th grade gathered. We believe the education activities were very successful and look forward to continue working in this area.

**PARTICULAR CHALLENGES FACED:** Torotoro National Park is an extensive area with interesting habitats and many big caves containing bats. Our aim was to survey most of the caves and habitats, but this was not possible due to the great distance between them and our lack of transport (even though we received some help from the park administration).
Live bats were shown to the property’s workers and Administrator.

AREA 8: YATIGÜIGUA  
DATES: April 10th to 25th, 2007

BAT SURVEY: Survey was carried out inside the Private Property of Yatigüigua. Mist nets were deployed in different micro habitats (creeks, ponds, pasture, corn plantation, and forest) using 48 to 60 meters of mist net opened for 5 to 6 hours for 9 nights. We captured 83 bats of 8 species, the most abundant were the fruit-eating bats (2 species, 67 individuals), followed by the insectivores (5 species, 10 individuals), and the vampire bat (1 species, 6 individuals). Acoustic recordings of the insectivores were also obtained from 10 species, 5 of which were not captured with mist nets, giving us a total of 13 species for the area. The Administrator also donated a bat specimen the employees captured and killed several years ago. I have not being able to correctly identify this specimen yet, therefore it is subject to revision with experts; it is highly likely that it constitutes a new record for the country.

THREATS ASSESSMENT: We carried out most of our activities inside a private property, therefore the contact with rural communities was minimal and only restricted to the day of education workshops. The owners of the property mentioned that they had a big problem with vampire bats in the past, and worked with a veterinarian to control them with vampire bat venom. Currently, the main activity of Yatigüigua is not raising cattle, and there are only around 50 livestock that do not show signs of vampire attacks. In the rural communities near the Property, people mentioned that the vampires attack mainly goats and chicken, but is difficult for them to control this problem. They usually do not kill the bats they encounter, except some children. They were unaware that fruit-eating and insectivore bats are present in the area.

EDUCATION: We carried out a very short educational workshop in the guaraní community of Ivamirapinta with children and some adults while they were waiting for medical attention in the sanitary post. Villagers were not very open to us, and it was difficult to obtain any participation from them. We believe that this is maybe in response to the fact that we were working/living in a private property and at the moment of the workshop the owner was with us. We also tried to carry out an educational workshop in the Boarding School of the community, but this was not possible because they were carrying out evaluation activities.

PARTICULAR CHALLENGES FACED: The survey was planned for a longer period but this had to be reduced because the Property’s Administrator was not in the area when we arrived (we could only start fieldwork with the Administrator present). Although is logistically easier to carry out the activities inside a private property, we found out that it is counteractive to the project’s education aims. Guaraní indigenous communities, like the ones near Yatigüigua, have historically been mistreated and in some cases enslaved by private property owners. Although this is almost entirely abolished in present days, we observed that there is still discrimination towards them; hence they are very shy and do not trust the owners and whoever is with them.
The crevices in Orícore Hill hold thousands of insectivores.

The park guards of Iténez Park and some villagers attended the workshop.

### AREA 9: ITÉNEZ DEPARTMENTAL PARK

**DATES:** June 19th to July 6th, 2007

**BAT SURVEY:** Bat survey was carried out in three sites: the small town of Bella Vista, a seasonally flooded Forest, and Oricore Hill. An effort of 54 meters of mist net opened for 5.5 to 7 hours for 11 nights was used for bat capture in the first two sites, whereas in Oricore Hill (one night) we photographed roosts and caught bats using the entomological net. Using mist nets, we captured 212 bats of 24 species. The most abundant were the fruit-eating bats (145 individuals, 9 species), followed by the insectivores (53 individuals, 11 species), the omnivores (5 individuals, 2 species), the carnivores (3 individuals, 2 species), and only one species of nectar-eating bat (1 individual). Acoustic recordings of at least 8 species were obtained, adding 3 species to the mist net survey. In Bella Vista we found many roosts located in people’s homes, and also in abandoned constructions. In the summit of Oricore Hill we found a very important bat roost of probably thousands of insectivores; it could be the largest insectivore bat roost in Bolivia. It is also noteworthy that 2 of the captured species are new records for Bolivia, and we captured the only paratype of a new species of *Micronycteris*; once the description is published, this species will constitute the only endemic bat species in Bolivia.

**THREATS ASSESSMENT:** In Bella Vista some people are aware that bats feed on many different items, but most of them told us that they didn’t know bats could be beneficial. Many homes have large colonies of insectivorous bats living in the ceilings that deteriorate the structure and cause bad odor in the entire house. This situation creates a major problem that people can’t usually solve permanently. Due to this problem, they usually throw bats away from these roosts, or even kill or poison them. All the bats we found in ceilings were insectivores (mainly of the Molossidae family) that are highly beneficial, and that need elevated roosts located in open spaces. The habitats that dominate the surrounding area of this site are Amazonian Forest and Savannah; therefore it is probable that open-space and elevated roosts are a limited resource. A proof of this is the roost we found in Oricore Hill, where thousands of molossids can be found under the permanent threat of predators.

**EDUCATION:** The workshop was carried out with the assistance of the Administration of Iténez Park; six park guards participated, and also a few villagers. We discussed the conflict created by bats living at people’s homes. It was very difficult to convince people that the solutions adopted for this conflict should respect the fact that they are treating with insectivorous bats that are highly beneficial. The conflict was clearly not solved with this workshop, and we think that a longer education period in the area is necessary.

**PARTICULAR CHALLENGES FACED:** Bella Vista is a small town with thousands of villagers who are very used to tourists and biologists walking around in the area, this is the main reason why our project did not call their attention, and we did not reach many people with the educational workshop. Also, it is noteworthy that bat survey in this area was overwhelming for the project, due to big amount of roosts and interesting microhabitats. We believe that sites like Oricore Hill need further research.
The park guards thought all bats were harmful, but they observed first-hand this is not true.

Fruit and nectar-eating bats live in close contact to villagers in Cóndor.

Acoustic recordings of at least 13 species were obtained, adding 8 species to the mist net survey. Three of the captured species are new records for the Department of Santa Cruz. One of the recorded species with Anabat is also a new record for Bolivia, and it was also registered in Area 4. We also evaluated and photographed 4 bat roosts (1 cave in Río Ichilo, 3 roosts in Cóndor); two of these contained hundreds of individuals of *Phyllostomus hastatus*, the second largest bat in the Neotropics.

**THREATS ASSESSMENT:** We worked together with two park guards of Amboró National Park and one of them commented that people in the surrounding communities usually think that there is one bat species that eats only blood, and whenever they encounter a bat, they kill it. He also told us that there are big colonies of bats living in the water pipes under the main road in Cóndor and that these roosts are permanently threatened because it is very common that the villagers, especially children, kill many bats there. When we checked these roosts, we found only very few individuals of two species (*Carollia* and *Glossophaga*). These low numbers are probably due to the constant perturbation caused by villagers. We also found another roost located in an abandoned house in Cóndor that contained hundreds of omnivore bats (*Phyllostomus hastatus*). Apparently this roost is also threatened by villagers that use a large stick to harm them.

**EDUCATION:** We carried out two educational workshops: one in ‘Ichilo’ community and another in ‘Cóndor’ community, both located outside the Amboró Park (the administration helped us with audiovisual material). In Ichilo, around 10 people assisted, and we presented photo slides and a documentary. After these activities people commented that they believed all bats were harmful, but the information we presented changed this perception. Due to some problems with the audiovisual material, we only presented the slide-show in Cóndor to around 20 people. Afterwards, we discussed with villagers our concerns about the disturbance of roosts. We suggested that these roosts, if protected, can be a tourist attraction in the future, specially the colony of *Phyllostomus hastatus*. Our project will continue the contact with these communities; we will provide them with information, and also we will work towards the conservation of roosts in the area.

**PARTICULAR CHALLENGES FACED:** This area is difficult to access, and it is not possible to obtain public transport to move around inside the area. The Administration of Amboró National Park was very bureaucratic for all logistical aspects, and we almost left the area after only 4 days of work because they lost our permit for specimen collection.
Among the major changes in our expenses are:

- **Bat survey equipment**: we decided to invest in a camcorder after we finished the work in area 8. During the educational workshops we have proved that images cause a bigger impression in rural communities, and we look forward to present them images of Bolivian bats, our work, and the rural communities in which we worked.

- **General fieldwork equipment**: we underestimated the amount of this equipment necessary to carry out our work. For example, in many cases we needed more than one tent. The medical kit was a costly item.

- **Transport and supplies for fieldwork**: the expense of this item for each area was different; in some cases as much as 4 people worked with us, or we had to spend a lot of funds in transport. We tried to balance this so we had enough funds to carry out the work in all sites.

- **Community education**: the preparation of workshops was not as costly as we thought it would be, and most of the funds for this item were spent for ‘Material for education workshops’. Some of this material has yet to be sent to the communities.

- **Printing and office**: we underestimated the budget for this item, which includes many small expenses, like communication or transport in the city for preparation of field trips.

- **Subsistence payments**: the fieldwork assistant suggested that we increase its subsistence payments.

- **Insurance for 2 biologists**: this item was not as costly as budgeted.

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IMPORTANT RESULTS

Contribution to the publication “Bats of Bolivia” (Aguirre, 2007) with unpublished data, 26 photos, and the description of families Mormoopidae, Natalidae, Thyropteridae, Molossidae (Siles, 2007).

Participation in the evaluation of the current conservation status of Bolivian bats (September 2006), where we contributed with all the ecological and distributional information obtained in this project. The publication of the results can be found in Aguirre et al. (2007).

Publication of the application of the Anabat system for acoustical bat detection in Bolivia (Siles & Terán, 2007), presenting information obtained in this project.

An important amount of educational material was produced: the villagers of La Vega (Area 1) received 5 informative plates with instructions of correct vampire bat control; all 21 students of the Bat Workshop in Torotoro (Area 7) received a folder containing information of bats, rabies disease, and an informative plate of the bats of the Dry Interandean Forests; each area received at least two informative poster of the bats found in the survey; 1000 posters and 67 t-shirts of the Bats of Bolivia were printed and will be distributed in each area surveyed and also across Bolivia.

Capture of the only paratype of a new species of Micronycteris; probably the first and only endemic bat of Bolivia.

We obtained specimens of 4 new records for Bolivia, one of which is accepted for publication (Siles, 2007), and also recorded one additional new record for the country using the Anabat system.

We obtained at least 23 new distributional records in the Departments of Cochabamba, Santa Cruz, Beni and La Paz using capture and acoustic methods.
THE FUTURE OF THE PROJECT

The bat survey results showed us that many areas or habitats need more research, the new distributional records we reported are an example of how little we know about the bat fauna in Bolivia. We learned through the threats assessment that, although people in general have bad concepts of bats, this depends on the type of rural community. For example, communities in the lowlands tend to observe animals’ habits, and therefore know more about the ecology of bats. Also, the conflicts people have with bats in each area are different, and not always related to vampire bats. In the future, the educational workshops need to adjust to these differences.

In this past year, we were able to determine important areas across Bolivia where further research and specific conservation actions are required. This is a major contribution to the knowledge and conservation of Bolivian bats, but a lot more needs to be done. The important results obtained in this phase of the project encouraged us to apply to Whitley Funds for Nature to continue for another year. We received an Associate Award (May, 2007) that will allow us to work in 12 areas across the country.

LITERATURE CITED


