

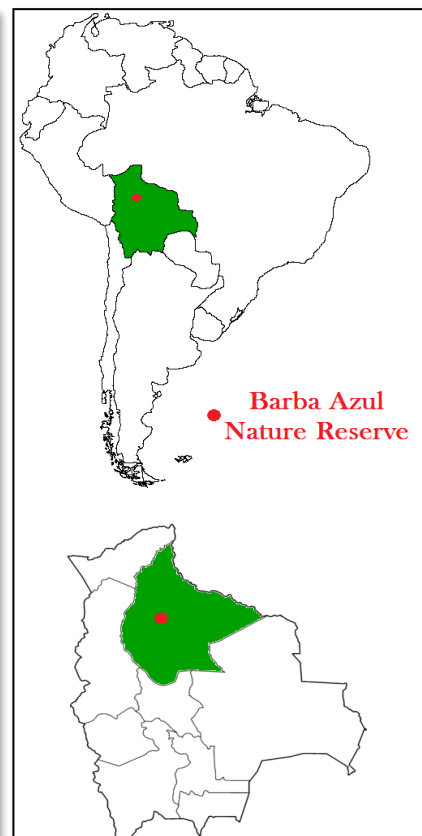
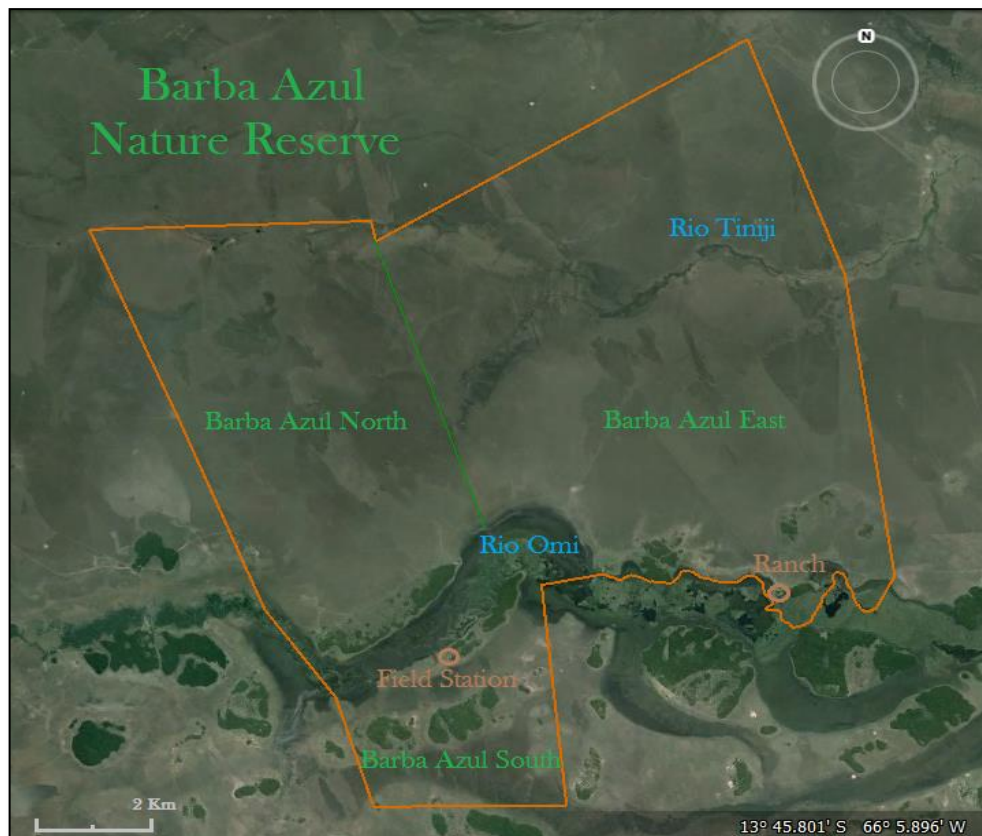
Friends of Barba Azul Nature Reserve Annual report 2017



Nick from Nicks Adventures mammal watching tourism agency in a close encounter with a Giant Anteater during his wildlife watching tour at the Barba Azul Nature Reserve. Picture taken by Tjalle Boorsma. Project photos can be downloaded from: www.flickr.com/photos/128583429@N05/albums/72157657123371838

Highlights of 2017

Not only was 2017 highlighted with the discovery of the unknown breeding grounds of the northwestern Blue-throated Macaw subpopulation, we also recorded the highest ever count of **155 Blue-throated Macaws** at the Barba Azul Nature Reserve roost. The increasing presence of high numbers of Blue-throated Macaws, make Barba Azul the most important site for conservation and ecotourism for this Critically Endangered species. Tourism promotion activities start paying off this year, as 3 big tour agencies have scouted Barba Azul, and are keen to sell it: **Nicks Adventures** (Bolivia), **WINGS** (USA) and **Neblina Forest Tours** (Ecuador). This in mind, we are more than pleased to have received funding to finalize tourism infrastructure and started to build the long-awaited dining facility, funded by **American Bird Conservancy** and **International Conservation Fund of Canada**. With help from the **Neotropical Migratory Bird Conservation Act** of the U.S. Fish and Wildlife service, we monitored again Buff-breasted Sandpiper movement. We also, started an amazing experiment of using trees for Life-Fences with the support of **World Land Trust** and continuing the sustainable cattle ranching activities funded by **March Conservation Fund** and **American Bird Conservancy**. We also earned support from two new project donors from the Netherlands that will support Barba Azul with an innovative new nest box program: **ARTIS Amsterdam Royal Zoo** and **IUCN Netherlands**.



Conservation and development of the Barba Azul Nature Reserve in 2017 was supported by:



Friends of Barba Azul
Nature Reserve



A grant from the
Neotropical
Migratory Bird
Conservation
Act





Figure 1. Blue-throated Macaws (*Ara glaucogularis*) mate during the end of the dry season (October) just before they migrate to their breeding grounds approximately 50 km north of the Barba Azul Nature Reserve. Picture taken by Daniel Alarcon

Barba Azul Nature Reserve 2017 Goals

Our main goals for 2017 to ensure a continuous development of Barba Azul Nature Reserve and its infrastructure were:

1. Establish impenetrable firebreaks throughout the reserve.
 - Parallel backburn firebreaks for perimeter (60m width)
 - Grid firebreaks (20m width)
2. Complete tourism infrastructure.
 - Establish a dining facility with the new design
 - Finish cabin improvements (interior and exterior design)

3. Barba Azul Nature Reserve infrastructure
 - Worker house for part-time staff and visiting construction workers
 - Present staff house improvements
4. Complete trail design through all habitats for visitors
5. Complete cattle ranching infrastructure
 - Paddock and perimeter fencing of Barba Azul East
 - Corral creation
6. Research
 - Blue-throated Macaw breeding site explorations
 - Blue-throated Macaws breeding site research project for master students

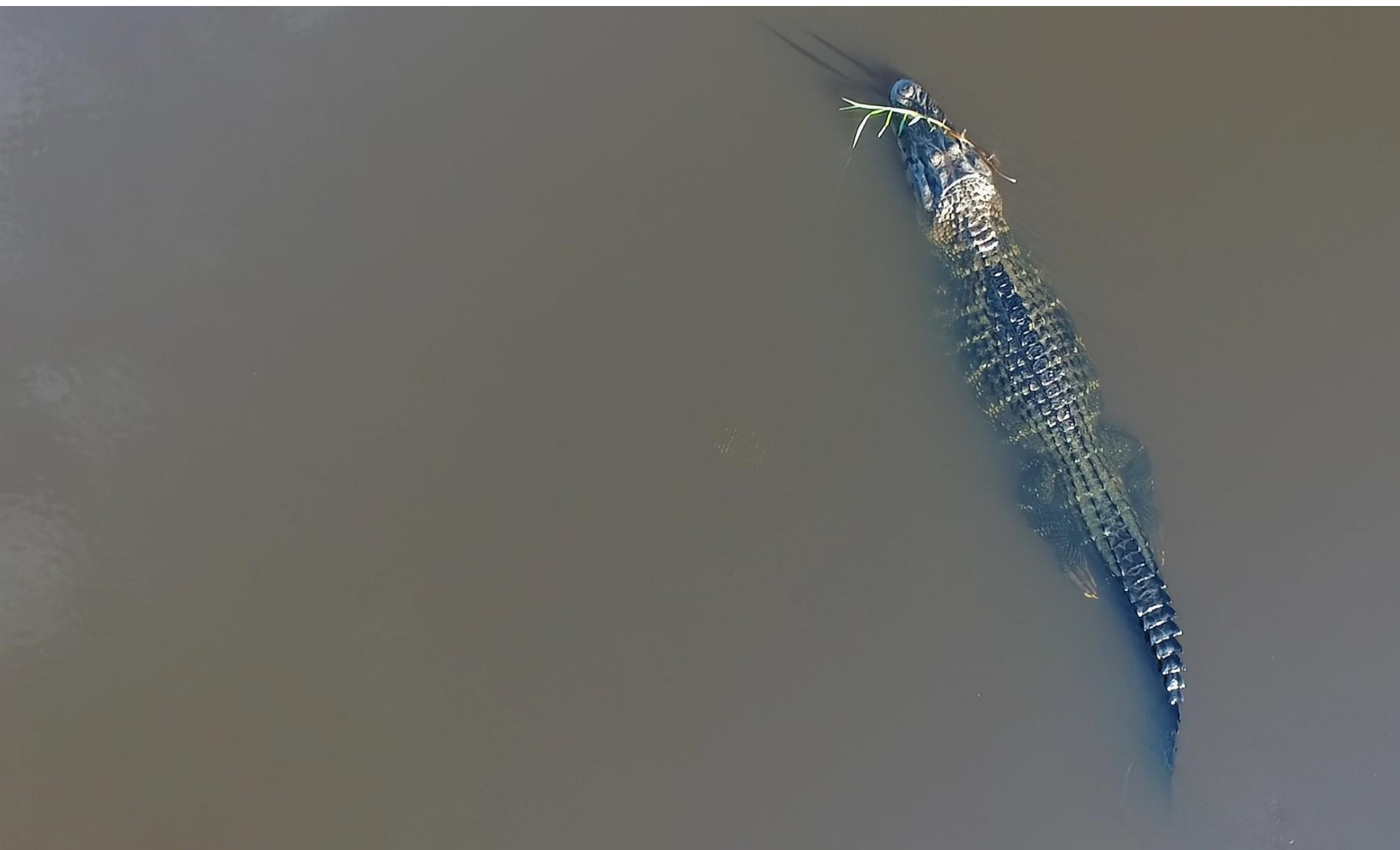


Figure 2. Black caiman (*Melanosuchus niger*) crossing the river Omi near the Barba Azul Nature Reserve lodge.
Picture taken by Tjalle Boorsma with use of the Barba Azul drone

Summary of achieved goals

Many activities have taken place at the Barba Azul Nature Reserve in 2017; core research in finding the unknown breeding habitat for the northwestern Blue-throated Macaw subpopulation, fully finished firebreak system in Barba Azul north and south, fully fenced perimeter, the beginning of building the dining facility, and the continuation of Motacu and Aliso habitat improvement activities.

1) Establish Impenetrable firebreaks

A total of 64 kilometers of firebreaks have been improved and established at the Barba Azul Nature Reserve (Barba Azul North 35 km; Barba Azul South 14 km; Barba Azul East 15 km). No fires have entered Barba Azul North and South. With use of the newly purchased scraper blade for the tractor, we are now able to easily improve fire breaks for 2018. We still need to experiment with professional backburns, as well as creating a permanent firebreak system in Barba Azul East.

2) Complete tourism infrastructure

With help from American Bird Conservancy and International Conservation Fund of Canada we have received the base support to start building the dining facility, the final tourism infrastructure to be built. A contract was established with “To Peti Constructora SRL”, who take full responsibility in all measures to establish the dining facility. Due to severe rainfall at the end of October (early start of the rainy season), the transportation of the dining material was not possible. Construction will continue in the 2018 dry season. There is still a gap of 35,000 USD to purchase furniture, kitchen equipment, etc., for the completion of the dining facility. We also still need to find around \$11,000 support for the final finishing touches to the cabins, like bedside tables, chairs, etc.

3) Barba Azul Nature Reserve infrastructure

No significant steps have been undertaken to improve and extend other infrastructure for field staff house, new staff house and the extension of the field station. Architectural designs will be presented in February 2018 to find funding for these infrastructure developments.

4) Complete trail design

The finishing touches for the “Barba Azul trail map” are being completed for January 2018. The map shows all the established trails as well as the habitats to see the “Big 7 of Barba Azul Nature Reserve”; Blue-throated Macaw, Buff-breasted Sandpiper, Cock-tailed Tyrant, Sharp-tailed

Tyrant, Black-masked Finch, Streamer-tailed Tyrant and White-rumped Tanager. Trails are being improved, signs and plans to create the “Cerrado Trail” are in the work.

5) Complete cattle ranching infrastructure

We have not been able to start constructing the coral and establishing the paddock fencing due to a lack of timber in Santa Ana de Yacuma, the main port for timber purchases for the Yacuma province where Barba Azul is located. This was caused by low river levels, preventing the transportation from the harvesting areas to the port. We have been able to purchase 470 posts and 21 corner posts, which is 25% of the total amount needed. In the beginning of December, we were also able to receive the first materials for the construction and improvement of the coral. Further construction will be continued from June 2018 onwards.

6) Research

The discovery of 5 Blue-throated Macaw nest in January and March of the northwestern subpopulation has been a big step forward to understand the species breeding preference and to plan for further conservation measures. Also, the monitoring of the Blue-throated Macaws at Barba Azul resulted in the highest ever count of Blue-throated Macaws arriving at the roost, a staggering amount of 155 individuals. With the continuation of the Motacu regeneration study in the permanent sample plots throughout the reserve by Master students from the Wageningen University of the Netherlands, we work on better understanding the most important tree species for the Blue-throated Macaw.



Figure 3. Blue-throated Macaw pair on their natural nest discovered in January 2017 approximately 35 kilometres north of the Barba Azul roost. Picture taken by Tjalle Boorsma.

Protection

Establishing impenetrable firebreaks

2017 is highlighted with not a single fire burning the protected grassland area of Barba Azul North and South. This is a big result as in the last 5 years at least 4 extensive fires burnt important savanna habitat and the key foraging habitat of the Blue-throated Macaws. A total of 64 kilometres of firebreaks have been established and improved throughout the reserve. Barba Azul North has now a total of 35 kilometres of firebreaks protecting the most important Macaw foraging habitat and at least 1,500 hectares of savanna grasslands.

We established 14 kilometres of firebreaks in Barba Azul South (fig. 4) which turned out to be highly necessary after a big fire entered this part of the reserve in 2016. Prevailing winds mainly coming from the northwest, make this area less susceptible to fire, but during the start of the dry season, strong winds also come from the south, and together with unpredictable burning activities from neighbouring ranches, protection is needed. Therefore, full border and grid firebreak system in Barba Azul South was established to ensure the protection of 665 hectares of savanna habitat.



Figure 4. The Barba Azul John Deere tractor established and improved firebreaks in Barba Azul South. This is a long-term work plan as building firebreaks is a tedious task and can only be executed in a short window of time when soils are dry. These firebreaks have first been ploughed followed by removing of remaining dead grass material with the newly purchased scraper blade. Picture taken by Tjalle Boorsma.

A total of 15 kilometre of firebreak has been constructed at Barba Azul East. As our aim goal was to fully protect Barba Azul North and South from neighbouring fires from entering, only the accessible firebreaks have been established in Barba Azul East. Due to uncontrolled fires from the eastern most neighbour, 500 hectares got burned. Also, a lightning strike caused a fire in 4-year-old grasslands in the westernmost part of Barba Azul East, burning 170 hectares of natural grasslands. As most of the crucial firebreaks have been established and only need maintenance, we can focus on establishing impenetrable firebreaks in Barba Azul East for 2018.

With help from [American Bird Conservancy](#) and [March Conservation Fund](#), we were able to purchase a scraper blade to clean up the firebreaks from dead grass residue. This has been a great success in Barba Azul South as the firebreaks are left with only barren soil. Additional activities like 60 metre backburning to ensure short grass pastures with low fuel intensity, still has to be experimented with. Contacts are made with the [Ohio State University](#) to plan for burning experiments with a Scottish PhD student and possible training for the Reserve Coordinator.

Figure 5. Scraper blade for cleaning firebreaks from remaining dead grass residue causing possible crossing fires over the firebreaks. Picture taken by Tjalle Boorsma.



Fully fenced perimeter

With the continued support from **World Land Trust**, we were able to finally fully fence all borders of the Barba Azul Nature Reserve, in order to ensure Motacu protection in Barba Azul South. This is a great success as Barba Azul South is now fully protected from neighbouring cattle, stopping the negative effects of cattle inhibiting Motacu seedling establishment as well as compacting soils, preventing seed germination. A total of 2.5 kilometres of fencing has been improved at the westernmost border, and 4 kilometres of new fencing was established at the easternmost corner (fig. 6). Not only have we placed new fence poles, we also started experimenting with planting Aliso trees beside the post, substituting them after approximately 10 years, not having to replace fencing posts in the future (more detailed information under “management”).



Figure 6. A total of 4 kilometres of new fencing has been placed at Barba Azul South, finally preventing neighbouring cattle from entering. This has been a great success as all perimeter of Barba Azul Nature Reserve is fenced. Also, we experiment with planting trees as living tree posts for the future. Picture taken by Oscar Yabeta.

Tourism

Complete tourism infrastructure

With the incredible help from [American Bird Conservancy](#) and [International Conservation Fund of Canada](#), we are able to start constructing the Barba Azul dining facility. A contract was established with “To Peti Constructora SRL”, who take full responsibility in all measures to establish the dining facility. In July we teared down the old shed where the dining facility will be built. All the materials were recycled. The clay walls have been used to increase the foundation (fig. 7), timber and roofing material have been used to construct a short-term storage area and the window frames were used as stakes to highlight the permanent Motacu sample plots.

We knew it was risky to start the construction work this year as funding, creating & signing contracts, as well as other administration activities were concluded half September, already 2.5 months in the dry season. After the first payments to purchase materials, it took the contractor another month to receive the core of all the construction material, right at the moment when the rain storms started to become more frequent. In comparison to last year, when heavy material was still able to be transported to Barba Azul in December, this year at the end of October it became impossible to reach the reserve. Preparation activities have taken place like establishment of foundation, digging main pillar holes, and the establishment of the contractor’s base camp.



Figure 7. Established dinning facility foundation with recycled wall material from the old shed. Picture taken by Tjalle Boorsma.

Visiting tour agencies

Barba Azul was this year scouted by 3 big tour agencies that want to sell the reserve for their future birding/wildlife watching trip; **Nick's Adventures** (Bolivia), **WINGS** (USA), and **Neblina Forest Tours** (Ecuador). It should be noted that Nick's Adventures is interested in selling Barba Azul for mammal watchers, which is a new client base for us. In September Nick's Adventures visited Barba Azul on his first Wildlife Watching trip. They observed the Giant Anteater four times and on his last day the elusive Maned Wolf. He is keen to coordinate more trips to Barba Azul, and we are working with him on how to improve Barba Azul for the mammal watching clients.

(<http://nicksadventuresbolivia.blogspot.com/2017/09/amazing-wildlife-watching-trip-report.html>).



Figure 8. Nick's Adventures (far right) visited Barba Azul Nature Reserve for the first time with two German tourists seeing the two main highlight species for their Wildlife Watching and Photography tour: Giant Anteater and the elusive Maned Wolf. Nick wants to promote and sell Barba Azul as the best spot in Bolivia to see these species. Picture taken by Tjalle Boorsma.

Tjalle guided Richard Hoyer from WINGS birding tours for a total of 4 days to get him acquainted with the reserve, the best spots to see birds, where to see the “big 7” and the tourism facilities. Not only did he see around 200 birds, he also encountered 5 new species for the reserve: Ruddy Quail Dove, Yellow-green Vireo, Tropical Parula, Alder Flycatcher and Grey-breasted Crake. His trip was followed by a 2-day trip of Xavier Munoz from Neblina Forest Tours, interested in selling Barba Azul in the future and establishing a long-term relationship. He presented many ideas and improvement tips to make the facilities more comfortable. These are important steps to ensure economical sustainability through eco-tourism in the near future.

We would also like to thank **Brian Kleupfel** from **Lonely Planet** and Birdwatching Daily to actively support Barba Azul Nature Reserve with a great article published in the BirdWatching magazine in the December 2017 issue, promoting Armonía’s conservation work and the Reserve.

<https://www.birdwatchingdaily.com/featured-stories/fighting-blue-throated-macaw/>



Figure 9. First ever recording of Ruddy Quail Dove (*Geotrygon montana*) at Barba Azul Nature Reserve spotted by Richard Hoyer on his WINGS scouting trip to the reserve. Picture taken by Richard Hoyer.

Management

Completing cattle ranching plan and infrastructure

It has been a struggle finding all the material for paddock fencing and coral improvements. A total of 470 posts and 21 corner posts were purchased which resembles 25% of the total 15 kilometre of paddock fencing needed. We established a contract with a local contractor who will be in charge of the improvement activities related to the coral. As with finding the fencing material, only in December he was able to receive the construction material, too late to transport to the Barba Azul Nature Reserve as road conditions were worsening due to increasing rainfall.

It came to our understanding that there has been a lack in timber materials due to very low river levels. As the 2016 rainy season was fairly dry, and the 2017 dry season dry as well, few timber was being able to be transported over the rivers to the main port near the Barba Azul Nature Reserve at Santa Ana de Yacuma. On the other hand, the early rainfall in the 2017 rainy season improved river levels, enabling transport of timber from the logging areas to the port, but inhibits transport from Santa Ana de Yacuma to the reserve. These fencing and coral improvement activities will be postponed to the dry season 2018.

On a more positive note, we did receive continuous funding from **March Conservation Fund** together with **American Bird Conservancy** of a total of 44,630 USD for cattle purchase and rancher salary to work the herd. This is the next step to get Barba Azul Nature Reserve towards its economic sustainability where funding is generated through beef sales produced under an alternative eco-friendly ranching system.

In order to gain more knowledge on how to manage natural grasslands and cattle in the most sustainable way conform the holistic ranching model, Tjalle Boorsma visited the 11th cattle ranching congress organized by the Alianza del Pastizal in Encarnacion Paraguay. During his visit, a workshop on “Holistic management, rotation systems & planning” was attended and crucial information was gathered. Beside the presentations given during the congress, an important meeting was held on the “Hemispheric Grassland Conservation Plan” which was initiated last year in Argentina, and attended by Rodrigo Soria-Auza and Tjalle Boorsma. During this second meeting, Tjalle gave a presentation about the Barba Azul Nature Reserve and the cattle management activities we are implementing. In addition, we worked together with other countries to establish a plan for future conservation activities.



Figure 10. During the 11th cattle ranching congress organized by the Alianza del Pastizal in Encarnacion Paraguay, Tjalle visited two ranches, demonstrating their eco-friendly management activities and explaining their struggles and successes. F.L.T.R: Tjalle Boorsma, Jorge Brizuela, Alberto Rautenberg. Picture taken by local rancher.

Motacu palm protection

We are very pleased to inform that the second big Motacu protection program has been successfully finished. The first program was the reforestation of Motacu seedlings on 7 forest islands in the Tiniji river system, followed by the Motacu protection plan for Barba Azul South, inhibiting cattle from entering the reserve, damaging regenerating Motacu plants. Both programs were successfully finished and fully supported by **World Land Trust**.

A total of 4 kilometres of new fence has been placed at the easternmost border of Barba Azul South (fig. 6). In addition, a total of 2.5 kilometre of fence has been improved and mainly replaced at the westernmost border of Barba Azul South. The total of 350-500 head of cattle from neighbouring ranches that were roaming free are now removed from the reserve and the forests islands can now slowly recuperate.

Now that cattle are no longer a disturbing factor, other conservation measures can finally be undertaken to ensure a quick recuperation of the forest islands with natural tree species and Motacu palm in specific. Tjalle, together with a Jelger Elings from the Wageningen University of the Netherlands, collected over 400 recently eaten Motacu fruits by Blue-throated Macaws from the main foraging island (Isla Barba Azul) North of the river Omi, to plant them South of the river Omi on regeneration deprived forest islands. Blue-throated Macaws tend to eat the fruit from the Motacu seeds in a spiral way (Blue-and-Yellow Macaw eat fruit in elongated way) and are therefore easily recognized. We chose these seeds as we want to increase their foraging habitat with Motacu palms that are favoured by the Macaws. Each island received



over 200 seeds planted just under the surface in the moist black soils. In order to increase root access, we opened up the soils with use of a spade.

Another experiment that already showed significant results is the “Gap Creation” activities that Tjalle together with Marc Meeuwes implemented in July, where mature Mango trees (exotic tree species) were felled in order to create a gap where sunlight is able to penetrate to the forest floor. There is no sunlight under a monodominant Mango stand, and local trees species cannot establish themselves. Only 5 months after the gap creation, Motacu seedlings are establishing themselves in the gap. Now that cattle are no longer present (cattle tend to sleep under Mango forest), these small Motacu seedlings can develop.

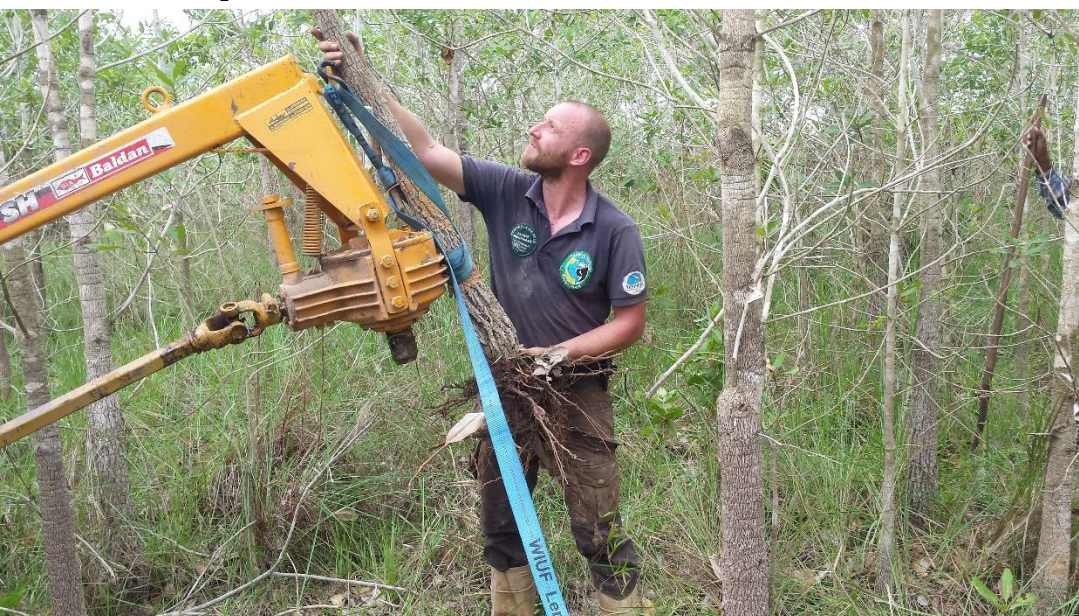
Figure 11. Spiral formed Motacu seeds are collected as they are eaten by the Blue-throated Macaws. These seeds from the main forest island where the Macaws forage, were planted on regeneration deprived forest islands in Barba Azul South. As cattle is no longer present, we are finally able to increase possible foraging habitat with favoured Motacu throughout the Barba Azul Nature Reserve. Picture taken by Tjalle Boorsma



Figure 12. Motacu seedlings sprouting after creating gaps in a monodominant Mango stand at Barba Azul South. Gap creation was only established 5 months before this picture was taken. Not only Motacu, but also other native species germinated, demonstrating the importance of the natural seedbank. Future maintenance activities will be the eradication of Mango seedlings. Picture taken by Tjalle Boorsma.

Aliso live fencing program

Another important **World Land Trust** supported program is the Aliso live fencing program, where Aliso trees are planted beside already established fence posts, in order to replace these conventional posts with living tree post, that no longer need replacement. The Aliso live fencing project is an innovative and experimental project where Aliso Trees (*Vochysia divergens*.) are used as live posts for fencing in the Barba Azul Nature Reserve. This family is only found in the Neotropics. This will provide an alternative to the continuous deforestation of local hardwood timber for cattle production fencing infrastructure. Aliso is a fire and flood resistant tree species found throughout the flooded hyper-seasonal savannas of the Beni department.



For this project we purchased a mechanical drill to create planting holes for the Aliso trees. But we also used this mechanism (without the drill) to take out large Aliso trees from their natural nursery (fig. 13). This turned out to be highly successful and in a short amount of time trees can be excavated and planted.



Figure 13 & 14. Tjalle Boorsma taking out large Aliso trees from its natural nursery with use of the mechanical drill. The same drill is used to create planting holes where the trees are planted 10 metres apart for future live fence posts. Pictures taken by Jelger Elings and Tjalle Boorsma respectively.



Figure 15. A total of 20 translocated Aliso trees and 20 3-meter-long trunks were planted in flooded savanna conditions to see which method is the most appropriate to execute the Aliso live fencing program. Picture taken by Tjalle Boorsma

As this project is an experiment, we have tried out several methods in order to evaluate the best way to move forward. During the dry season in September we translocated 10 medium sized Aliso trees (see fig. 6). Unfortunately, they did not survive probably due to a lack of water. We repeated this method of tree translocation in the start of the wet season (November) where we translocated 40 Aliso trees and planted 20 in flooded conditions (fig. 15) and 20 in semi dry conditions (fig. 14). We also experimented with cutting large Aliso (DBH between 5 and 10 centimetres) trees and planting the 2.5 to 3 metre long trunks in the soil to see if they will sprout (vegetative reproduction). Again, 20 Aliso trunks were planted in flooded conditions and 20 in semi dry conditions. Results will determine the main method for the Aliso live fencing program.

Innovative nest box program

We would like to welcome two new project donors from the Netherlands that will support Barba Azul with an innovative new nest box program: **ARTIS Amsterdam Royal Zoo** and **IUCN Netherlands**. These contacts were established with the amazing help from Marc Hoogeslag from IUCN Netherlands who visited Barba Azul Nature Reserve in September (fig. 16). In July 2018 we will establish 10 new nest boxes at Barba Azul with a new design, mimicking the actual breeding preference of birds from northwestern subpopulation. There, the Blue-throated Macaws tend to breed in the tallest palms within marsh habitat, therefore we will create 10 nest boxes on tall eucalyptus trunks in the marsh habitat of the river Omi.



Figure 16. F.L.T.R: Carlos Roca, Tjalle Boorsma, John Terborgh, Lisa Davenport, Marc Hoogeslag and Bennett Hennessey, visiting the Barba Azul Nature Reserve in September. Picture taken by Oscar Yabeta senior.

Research

Blue-throated Macaw breeding site discovery

Record high number of Blue-throated Macaws are being observed at the Barba Azul Nature Reserve during the dry season between March and October. After mating in Barba Azul, they migrate to their unknown rainy season breeding grounds. Therefore, Armonía organized with the financial help from **American Bird Conservancy** and **Cincinnati zoo & botanical garden**, an expedition during the rainy season to find the unknown breeding grounds.

Two expeditions (each 2 weeks) have been executed to search breeding Macaws in the Yacuma province of Bolivia. A total of 5 nests have been discovered in native palm trees; *Mauritia flexuosa* (3) and *Acrocomia aculeata* (2). Also, an unknown roost was discovered with 10 birds 40 km north of the expected distribution range. Based on the collected information on site, from local people and habitat evaluation, we expect that the main breeding habitat is in *Mauritia* palm stands (breeding) near *Attalea* stand (foraging) along the Yata river area bending down to the eastern border of the Yacuma province. An additional four potential breeding sites have been selected for future explorations to verify the *Mauritia/Attalea* breeding hypothesis. A scientific article is in process to present these breeding habitat preference results for the Journal of Field Ornithology. For further reading and expedition videos click the link below:

<http://armoniabolivia.org/2017/03/17/armonia-discovers-new-breeding-area-for-the-critically-endangered-blue-throated-macaw/>

Blue-throated Macaw GPS tracking study

In continuation of the discovered natural breeding sites of the Blue-throated Macaws, we intended to capture 3 Blue-throated Macaws in the Barba Azul to allocate GPS trackers with use of a harness in September, just before the bird's migration to their wet season breeding grounds. This study was executed by Lisa Davenport with the professional help from John Terborgh who have been testing different types of trackers and harnesses on captive birds at **Loro Parque Fundación** in Tenerife, to ensure the right equipment for this study.

In order to capture the birds, an 8-meter-high platform was built that will function as a feeding station where corn and ripe Motacu fruits will attract the Macaws to this specific site. This turned out not to be successful due to a possible high abundance of food in the area. A second capturing method was established in the field after observing the Macaws drinking daily in



shortgrass habitat along the river Omi. It is necessary to capture the birds on the ground or flat surface to ensure the least stress to the birds, making it logistically more accessible and less possibilities of harming the birds. Lisa Davenport studied their behaviour for a week to pinpoint their drinking location. As the birds randomly chose their drinking areas a third method was developed. A plastic decoy bird that Armonía uses at our interpretation centre was used to attract the birds

(fig. 18). This turned out to be successful as birds tend to come down near it. Pitifully not close enough to get caught in the snares prepared by Lisa (fig. 17). This study will be continued next year as we have 3 GPS trackers in storage and have a better idea on the capturing method. Next year we will experiment with 2 decoy birds and a sound recording of a chick calling for help.



Figure 17 & 18. Lisa Davenport and John Terborgh placing snares in the river edge shortgrass habitat along the river Omi where the Blue-throated Macaws tend to drink. Carlos demonstrating the decoy bird in order to attract the birds to the placed snares. Pictures taken by Tjalle Boorsma and Oscar Yabeta respectively.

Buff-breasted Sandpiper monitoring

We also continue with our annual Buff-breasted Sandpiper study supported by the **Neotropical Migratory Bird Conservation Act**, where we evaluated the use of critical stopover foraging habitat by comparing different factors in grazing regimes of cattle and horses. This was the 6th year in row where we collect vital Buff-breasted Sandpiper data in the Barba Azul Nature Reserve. In the first week of September, Buff-breasted Sandpipers were monitored throughout the Barba Azul Nature Reserve. A team of 5 local ornithologists from Cochabamba who have several years of experience of surveying sandpipers at Barba Azul returned to the reserve. A total of 350 Buff-breasted Sandpipers used Barba Azul during the 2017 southern migration. This low number in comparison the last year could be related to the absence of cattle or other unknown factors. Marcia Mireya Salvatierra is writing her thesis on Buff-breasted Sandpiper migration with the 6-year data collected at Barba Azul in order to produce a manuscript for publication. She will study the important factors influencing Sandpiper abundance.



Figure 19. Marcia Mireya Salvatierra counting Buff-breasted Sandpipers (*Tryngites subruficollis*) in the Tiniji area, one of the most important stopover sites for the sandpipers. Picture taken by Tjalle Boorsma.

Archaeological research at Barba Azul Nature Reserve (PhD study)

Javier Ruiz-Perez from the **Universitat Pompeu Fabra (Barcelona)**, is a PhD student from Spain, who visited Barba Azul Nature Reserve in 2016 for a short pilot study to evaluate forest islands in the reserve for indicators of human origin, with success. This year he returned to start excavating one of the pre-Colombian build forest islands.

The aim of his study funded by **National Geographic** is to examine the transition from foraging to farming in southwestern Amazonia through a continuous archaeological reconstruction of the last 10,000 years. For this purpose, he carried out an archaeological excavation in the Barba Azul Nature Reserve. The reserve holds a suitable archaeological landscape made up of settlements established in mounds called forest islands, as well as agricultural fields and causeways. Forest islands, which are widely scattered in the Llanos de Moxos, are key for this investigation because hunter-gatherer and farming groups have occupied them in prehistoric times. This project will contribute, on one hand, to delve into the socioecological processes that led to the adoption of sedentism and agricultural subsistence strategies in the Amazonia, and on the other hand, to better estimate the degree of landscape anthropization that this region has undergone for thousands of years.



Figure 20. F.L.T.R. Javier Ruiz-Perez, Miguel Ortega Barbosa, Geraldine, excavating one of the forest islands to investigate hunter-gatherer presence, ages of deposit layers and other anthropological data. At every 10 centimetre of soil layer data was collected. Picture taken by Tjalle Boorsma.

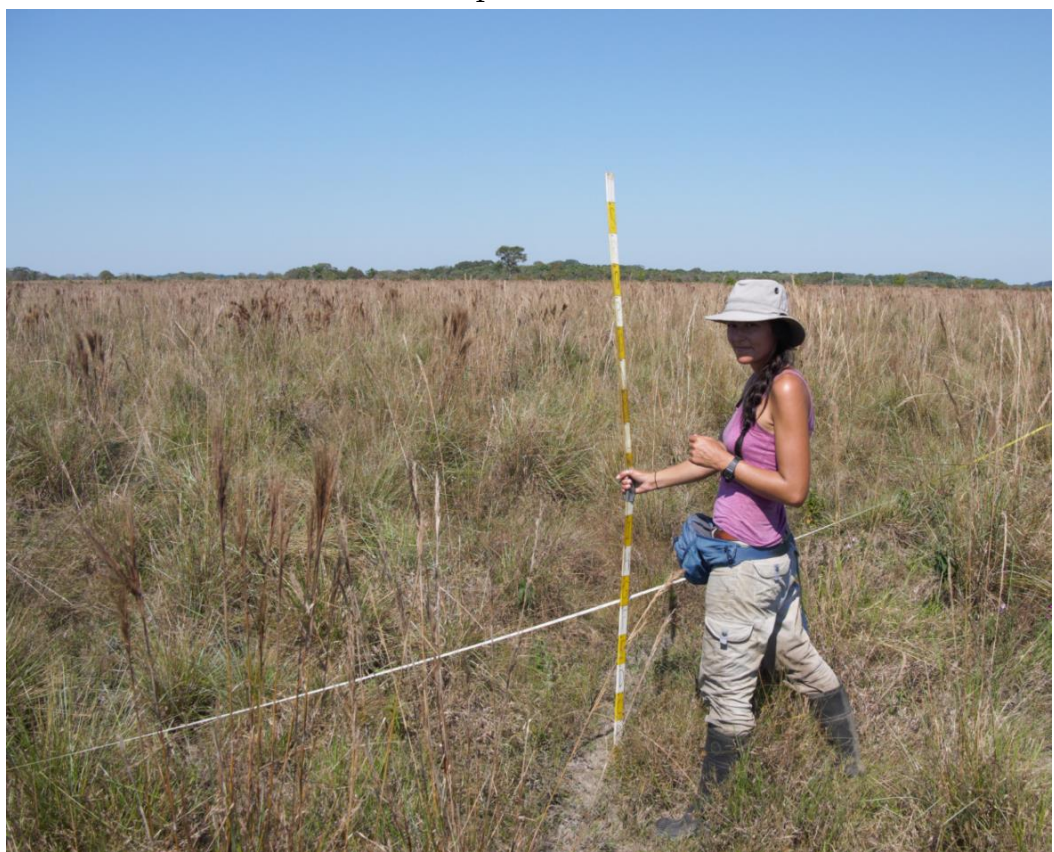
Cerrado-grasslands study (PhD study)

Jo Kingsbury, a Scottish PhD student studying at the [Ohio State University](#), started her research at Barba Azul Nature Reserve in July. She has been visiting Barba Azul 4 times before during the Glasgow University expeditions and is therefore fully acquainted with the Barba Azul Nature Reserve.

The aim of her study is developing a better understanding of how bird communities are influenced by vegetation structure and composition across the cerrado-grassland gradients of the Beni savannah ecosystem. Studying how these prevailing vegetation physiognomies are shaped by locally relevant ecological and agricultural disturbances, specifically fire, flooding and cattle grazing. This work will help to build a better understanding of how we can better manage and restore these habitats for different avian communities within the Barba Azul Nature Reserve while helping to inform more sustainable land use practices within the wider region which is currently under considerable threat from intensive cattle ranching.

Along the cerrado-savanna gradient 48 study plots were established where comprehensive vegetation assessment was executed to describe species presence and abundance. In each of these plots, point counts were undertaken to assess also bird presence and abundance. In addition to the core avian and vegetation assessments, she established flood monitoring stations at each of the 48 survey plots. She is trialing a new methodology using iButton thermal data-sensing technology.

Figure 21. Jo Kingsbury collecting vegetation data in the hot burning savannas of the Barba Azul Nature Reserve. Picture taken by Johnathan King.



Motacu continuation study (Masters study)

Jelger Elings is a Dutch Masters student from the **Wageningen University** in the Netherlands who collected his thesis data in the Barba Azul Nature Reserve in October. He has been remeasuring all the permanent sample plots established by Iris Hordijk in 2016, to study the regeneration of Motacu palm within the gallery forest and all Motacu dominated forest islands within the reserve. An interesting preliminary result is that Jelger measured 50% less Motacu seedlings in all the sample plots combined in comparison to last year. As in most of the Gallery forests and forest islands cattle is absent, other factors influence the establishment of the seedlings. We expect his thesis results in February 2018.



Figure 22. Jelger Elings measuring Motacu height on one of the forest islands to quantify the development of adult trees. In each forest island, sample plots have been established to measure all life stages of the Motacu in order to study the developments of this most important tree species for the Blue-throated Macaw. Picture taken by Tjalle Boorsma.

Barba Azul Nature Reserve 2018 Goals

For 2018 we will continue to conduct protection, research, and monitoring activities in Barba Azul throughout the year. We have set the following goals to ensure a continuous development of Barba Azul Nature Reserve and its infrastructure.

1. Maintain impenetrable firebreaks throughout the reserve.
 - Parallel backburn firebreaks for perimeter (60m width)
 - Establish firebreaks Barba Azul East
2. Complete tourism infrastructure.
 - Finish dining facility
 - Finish cabin improvements (interior and exterior design)
3. Establish solar energy
4. Barba Azul Nature Reserve infrastructure
 - Worker house for part-time staff and visiting construction workers
 - Maintenance of staff house, water system and field station
5. Complete cattle ranching infrastructure
 - Paddock and perimeter fencing of Barba Azul East
 - Corral creation
 - Establish herd of 500 head of cattle
6. Establish Blue-throated Macaw breeding habitat at Barba Azul Nature Reserve
7. Establish live fencing
8. Research
 - Blue-throated Macaw movement and breeding site research
 - Savanna habitat research
 - Buff-breasted Sandpiper habitat improvement and research

Accounting

Table 1. Friends of Barba Azul Nature Reserve expenses 2017 in US dollars

CODE	ITEM	Budget \$US	Expenses \$US. 2017 F-BANR	TOTAL \$us.
	STAFF			
6121	Field House Manager (Yuri Vaca)	1,700.00	510.10	1,189.90
6105	Ranger Assistant (Hernan Lopez)	400.00	390.00	10.00
6103	Barba Azul Assistant	1,000.00	340.07	659.93
5101	Admin Director	1,450.00	1,132.39	317.61
	MANAGEMENT			
6205	Field Food	1,100.00	162.17	937.83
6303	Transportation (land)	1,150.00	1,501.72	-351.72
6302	Transportation (air)	2,000.00	2,001.60	-1.60
6307-01	Fuel	500.00	406.47	93.53
	OTHER			
6711	Medicine	200.00	200.00	0.00
6401	Promotion	1,000.00	1,000.00	0.00
6901	Contingency	1,500.00	1,500.00	0.00
7101	Overhead	2,000.00	2,000.00	0.00
6427	Legal fees	0.00	2,050.00	-2,050.00
	Total According to Disbursement	14,000.00	13,194.52	805.48

2017 expenses

A total of 14,000 USD was disbursed related to the 15,000 USD budget presented to you at the start of 2017. According to the admin director, and additional disbursement through American Bird Conservancy is on its way. Half way through 2017 unexpected costs related to legal fees to ensure the continuation of the “Private Natural Reserve Creation” process popped up. Changes in the budget were made to ensure the payment of these costs. As additional funding was found, salary costs were covered. The balance of 805.48 USD (with all disbursements up to 15 December 2017) will be reserved for possible additional legal fees for 2018.

2018 Budget Barba Azul Nature Reserve

It is wonderful to see nature and people enjoying our protection efforts at Barba Azul. Wildlife continues to be more common and habitats are recuperating remarkably from a century of cattle impact. Barba Azul still has a few years of work to establish the basic infrastructure and systems to produce a long-term self-sustaining conservation reserve. We still need to raise the final dining facility support of \$35,000, finish cabins with \$11,000 support. It is also important to improve staff housing and branch out the field station to accommodate more people at a cost of \$25,000. In the next 2 years we will be trying to raise \$230,000 to make the final long-term cattle purchase of 800 head, which then will be self-sustaining forever. Ideally, we will also need to have a 4x4 vehicle for transportation, but also as a tourism safari vehicle during the tourism period height (July to Sept) at \$22,000.

For 2018 a total of 102,000 USD is fundraised for and another 238,000 USD is pending in proposals. As we received several scouting trips from tour agencies this year, booked reservations for 2018, will be purchasing the first cattle for the initial herd, 2018 will present great step forward towards generating a significant income flow.

The main management costs remain the same as the 2017 budget. As we are still awaiting confirmation for grant support, we would like to present out fully developed budget during the first Friends of Barba Azul report in the beginning of next year.

Barba Azul Nature Reserve list of needs		
Item	USD	Justification
Final dining facility support	35,000	Have complete dining facility for ecotourism including all necessary equipment
Final cabin improvements	11,000	Ensure full comfortable cabins
Staff house and field station improvements	25,000	Improvement of staff house and amplifying the field station to accommodate more people
Solar	15,000	Have Barba Azul running on renewable energy, ensuring electricity access 24/7
Cattle	230,000	600 head of cattle, 30 bulls and 10 work horses to ensure a sustainable herd
Safari vehicle	18,000	Vehicle to show tourists the abundance in wildlife
Pontoon	15,000	Pontoon to cross the river with heavy machinery, horses and cattle. Pontoon, wooden boat, canal excavation and outboard motor
Marsh board walk	10,000	Board walk through the marsh to have best marsh access and easy crossing of Omi river