

## Barba Azul Nature Reserve

### November 2016 update report

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In September, the largest group of Blue-throated Macaws ever recorded was reported from the Barba Azul Nature Reserve by Fabian Meijer, Dutch ecology student, conducting his research on environmental factors determining Blue-throated Macaw distribution within the reserve. A group of 118 individuals was observed arriving at their wet season roosting site in the northern tip of the Barba Azul Reserve. Project photos can be downloaded from: <https://www.flickr.com/photos/128583429@N05/albums/72157657123371838>

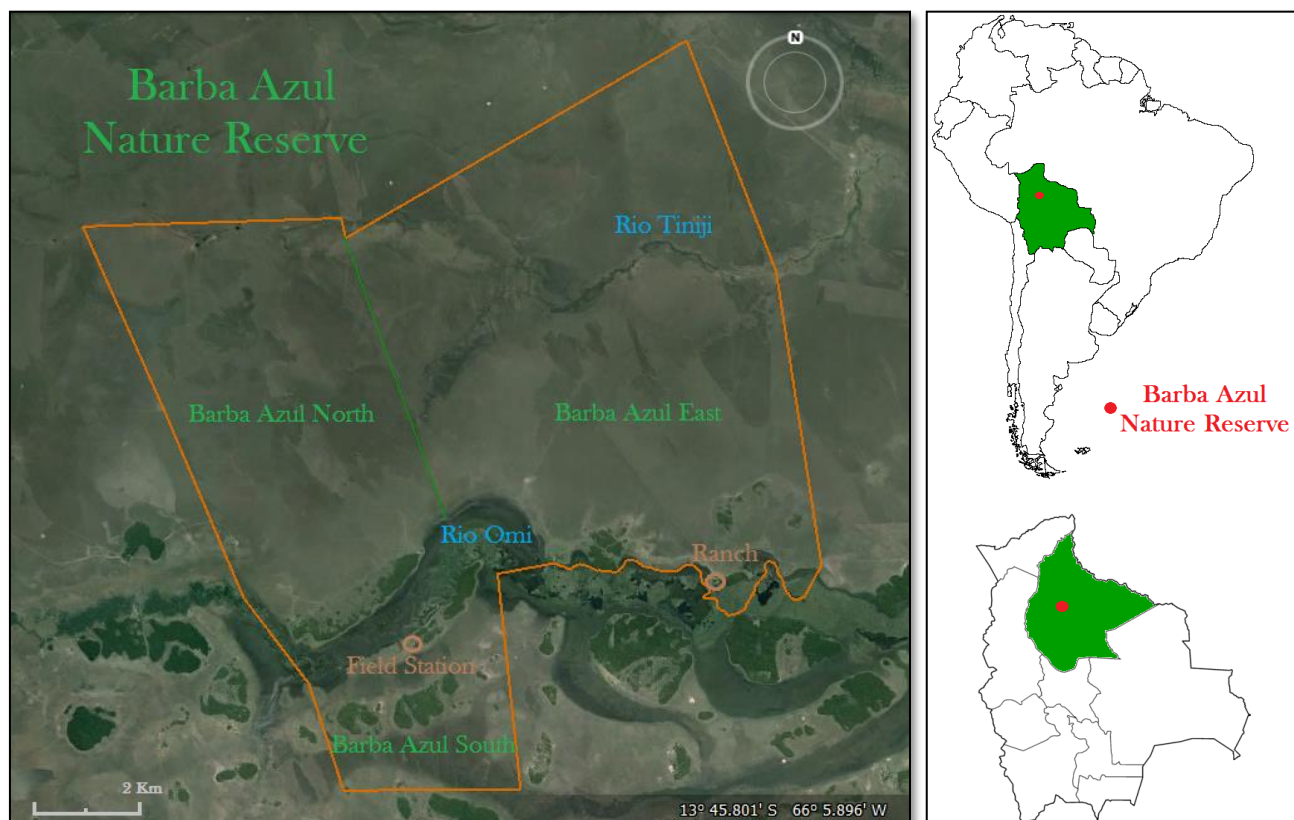
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### Introduction

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Dark clouds bring increasing rainfall and are slowly filling the seasonally-flooded savanna habitat with water again, making the area inaccessible by vehicle. The start of the wet season also is accompanied with the local migration of Blue-throated Macaws to their wet-season breeding grounds. The Barba Azul Nature Reserve had the highest ever count of Blue-throated Macaws in the Beni. An impressive number of 118 individuals were counted, presenting approximately half of the entire population, dependant on the reserve to forage and roost during the wet season. Other highlights have been the finalizing of the cabin improvement project and the reforestation of 7 forest islands, as well as the highest day count of Buff-breasted Sandpipers ever. An astonishing number of 1460 individuals counted in 1 day.





Conservation and development of the Barba Azul Nature Reserve is supported in 2016 by:



A grant from the  
Neotropical  
Migratory Bird  
Conservation  
Act







Figure 1: All four cabins at Barba Azul Nature Reserve have been improved with extended roofing and improved mosquito netting. With the increased roofing, we also ensure a cooler climate as no direct sunlight is entering the cabins. We also improved the cabins with self-made tables and shelves, as well as hangers for clothing and door springs to make the cabins more comfortable. The cabin improvement project has been successfully finished. Photo by Oscar Yabeta.

## Barba Azul Nature Reserve 2016 Goals

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Our main goals for 2016 to ensure a continuous development of Barba Azul Nature Reserve and its infrastructure.

- 1) Establish Impenetrable firebreaks
- 2) Complete tourism infrastructure
- 3) Complete cattle ranching plan and infrastructure
- 4) Fully fenced boundary
- 5) Fully reforested Tiniji forest islands
- 6) Savanna age-class and Motacu palm monitoring program
- 7) Buff-breasted Sandpiper improved habitat, and foraging data
- 8) Blue-throated Macaw population monitoring program



## Protection

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### *Establishing impenetrable firebreaks*

This year has been a very extreme dry year due to the lingering effects from El Nino. Cattle ranchers have expressed their concern to the government as cattle were dying due to a lack of food resources. This allowed ranchers to burn their pasture lands without the necessary control from governmental bodies, increasing the man-made fires throughout the Llanos de Moxos savanna eco-region. To ensure a quick re-sprouting of grasses that generate a short term beneficial effect on food availability thousands of man-made fires were lit.

Ecological and long term effects of these fires put the Llanos de Moxos savanna ecosystem and local people in danger. Not only does the savanna lose vital ecosystem services, we also contaminate the atmosphere and local people with deteriorated atmospheric conditions. The burning of the top soil during the dry season destroys the micro-fauna of the soil, affecting its fertility. After heavy rainfall, ashes and other burnt matter are flushed to river systems affecting water quality and aquatic ecosystems.



Figure 2: Self-functioning fire break at Barba Azul South. These fire breaks aren't finished yet as the grass residue on the ploughed areas could cause the risk of fires smouldering over the fire break to the other side. Picture taken by Tjalle Boorsma.

Small fires do occur naturally in savanna habitat each year, mainly during the wet season as the skies are filled with thunder weather, and each light bolt producing a small fire. During this season these fires don't get out of control neither affect the micro-fauna of the top soils. Large natural fires are expected to occur only at a rate of every 20 years. Man-made fires with a frequency of almost twice a year during the dry season, deteriorate the ecosystem, and endanger its biodiversity.

Due to the extreme drought and the uncontrolled burning by neighbouring ranches we have had several fire threats in the reserve. However, this is the first year that our self-made fire breaks have been fully successful. Now we must focus on extending firebreaks to ensure full protection of all tallgrass habitat in the reserve. As shown in picture 2, firebreaks are still not optimal due to grass residue on top of these firebreaks causing the possible risk of fire smouldering from one end to the other.

With help from March Conservation Fund and American Bird Conservancy who we presented our concerns in fully protecting the reserve from fires, we are able to purchase an additional tractor implement in 2017 that will ensure grass free fire breaks. This Hydraulic Scraper is an implement that can be placed behind the John Deere tractor which will clean firebreaks from grass residue. This implement can also raise soil from one side to the other which is useful to create elevated trail/road systems throughout the savanna. With this tool, we will be able to establish parallel raised firebreaks, where we can back-burn the grass in-between to ensure resistance to the most destructive fires coming from the prevailing winds of the North-west. We can also create a trail system that is sufficiently high enough during the wet season. This trail system can be used to explore the tall-grass savanna habitat throughout the year. But more

important, it creates a trail that can be patrolled on bicycle in the wet and dry season. A quick way of movement throughout the reserve.



Figure 3: Fire at Barba Azul North entering the reserves property. Due to wet soil conditions, it was impossible to create firebreaks along the northern border of the reserve. Drone image Glasgow University.



## Management

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### *Fully reforested Tiniji forest islands*

In September/October Tjalle and Marc Meeuwes (reforestation expert from the Netherlands) reforested 7 degraded forest islands in the Tiniji river system and were able to successfully finish the Motacu reforestation project for Barba Azul East. This project was fully supported by World Land Trust helping us restoring this important eco-system. These small Motacu dominated forest islands lack natural regeneration due to decades of continuous cattle herbivory on trees seedlings and soil compression. These factors fully inhibited the growth of regenerating trees.

A total of 7 out of the 13 raised forest islands (possibly pre-Colombian anthropogenically made) have been completely fenced off and reforested with 100 to 150 Motacu palms depending on the size of the islands. Trees range from a size of 30 to 250 centimetres to ensure a difference in age. Trees have been excavated from the Isla Barba Azul in Barba Azul North where they naturally regenerate and were planted in a random manner on these forest islands.



Figure 4: Recently planted Motacu saplings at forest islands in the Tiniji area of Barba Azul East where decades of cattle ranching inhibited natural regeneration of trees. This reforestation project ensures the survival of the forest islands. Picture taken by Esther van Nissen.



## Reforesting 7 forest islands

## Finished



Figure 5: Marc Meeuwes moving recently excavated Motacu saplings to the pre-planting canals where they were pruned before their translocation the next day. Picture taken by Esther van Nissen.

A Total of 700 Motacu sapling have been excavated from the natural nursery at Isla Barba Azul where cattle has been absent since 2008 and where regeneration has been prolific. Motacu sapling have a large tuber where all their energy is stored, making them drought and fire resistant. This explains the fact that after a fire and when all leaves have been burnt, the saplings re-sprout in weeks as all their energy comes from this tuber.

All excavated saplings were first pruned by removing all fronds until only 2 remain. This to prevent transpiration from the fronds, as the effect of translocation is a severe action where roots are damaged and less water can be transported. After the pruning, all trees were first pre-planted in canals with added soil and water to prevent drying of the roots as they were translocated the next day.



Figure 6: Pruning and pre-planting of Motacu saplings at Isla Barba Azul. The canals where the saplings were pre-planted was fenced to prevent free-roaming feral pigs to dig up the sapling to feed on the tubers. Personal experience. Picture taken by Esther van Nissen.



On the days of translocation from Isla Barba Azul to the Tiniji area (between 5 to 15 km depending on the location of the island), the saplings were transported in water tight bags so roots would have the least effect from drying out from the sun. At their destination at the pre-Colombian Motacu dominated and fully fenced forest islands, holes were dug and the saplings were planted. Depending on the size of the island, 100 to 150 saplings were planted.

While digging the holes, we discovered that the first 5 cm of soil was completely compacted, clearly by cattle pressure, explaining the impossibility for seedling to establish on these islands. Under this compacted layer, we found a moist and nutrient rich black soil. According to locals and our own experience in reforestation, the soil type of the forest islands and the plant specific characteristic (tubers providing drought resistance), we expect a very high success rate of the translocation of Motacu saplings.



Figure 7: Tjalle Boorsma demonstrating the compacted top soil inhibiting seedlings to establish themselves on the forest islands. Picture taken by Marc Meeuwes.





Figure 9: F.L.T.R, Marc Meeuwes, Hernan Lopez and Tjalle Boorsma planting the final trees of the Motacu reforestation project at Tiniji, supported by World Land Trust. Picture taken by Esther van Nissen.

### Ringling of parasitic fig trees. **Finished**

All mature Motacu trees on the reforested Motacu islands have been liberated from parasitic fig trees to prevent dying of the old stand. These trees have to survive until the new sapling become large enough to produce fruits for the Blue-throated Macaws and being used for roosting. Strangler figs up until a diameter of 50 cm have been ringed. In this case, ringling consists of the removal of part of the stem to prevent water and nutrient flow from the roots to the leaves. The upper part of the fig tree will slowly dry out and fall little by little to the ground.



Figure 10: Tjalle Boorsma ringling parasitic fig trees at Tiniji. Picture taken by Esther van Nissen.



### Additional ecosystem restoration activities

Other Motacu forest restoration activities have been undertaken to ensure the survival of this specific ecosystem, highly important for the persistence of the Blue-throated Macaw.

### **Seed allocation and soil preparation**

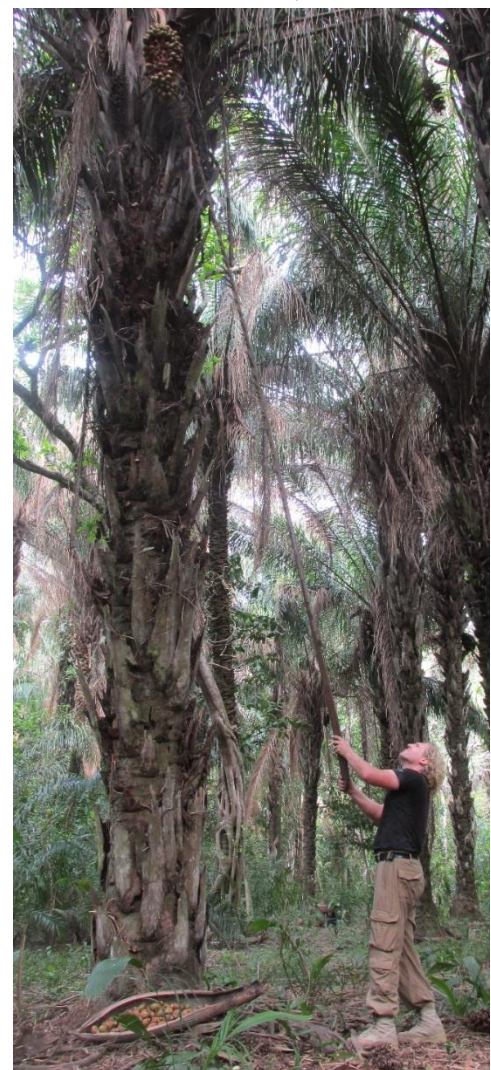
Seeds have been collected at Isla Barba Azul from fruiting trees where Blue-throated Macaws have been seen foraging on. The genetic composition of these fruits is apparently attractive to the Macaws and are therefore harvested to be spread on forest islands at Tiniji. In order to ensure higher germination and development possibilities, the hard-impenetrable top soil was opened with spades to ensure easy root passage for recently germinated Motacu seedlings.

### **Experimental plots on forest islands used by cattle**

Of all the 13 forest islands in the Tiniji area, 7 have been fenced and reforested and the other 6 are still open for cattle to use. Cattle need raised forest islands as shelter from cold fronts, storms, and to periodically dry their hooves, as they are not adapted to flooded savanna habitat. We have fenced off an area of 10 by 10 metres on a forest island used by cattle, to observe how quick the seedbank will respond, germinate, and develop when cattle are not trampling or eating recently germinated seedlings. If we observe quick response of germinating Motacu seedlings, we would like to start a project to partially fence Motacu forest Islands throughout the Beni Department. We can safely predict that most private cattle ranches will lose 90% of their Motacu Palm trees in the next 50 years, so this might be a quick and cheap method to promote regeneration for the many enormous cattle ranches. This will be cheaper than fully fencing islands, they are still open for cattle use and little by little these forest islands will have a new generation of Motacu trees.

It will be a rotation system where one area of the island is fenced, seedlings are able to establish themselves until they are strong and high enough so cattle will not destroy them. If the saplings are big enough, the fence is removed and placed at another spot on the same island to assure regeneration of Motacu in the next 10 by 10-meter plot.

Figure 11: Marc Meeuwes collecting Motacu seeds. These apparent juicy fruits are placed at forest island at Tiniji. Picture taken by Tjalle Boorsma.





### *Completing cattle ranching plan and infrastructure*

The sustainable cattle ranching model that we would like to establish in Barba Azul East where we will present an alternative ranching model that is more productive and ecosystem friendly, has reached its next phase. Armonía with the Barba Azul Nature Reserve has won the third financial support from the March Conservation Fund in collaboration with American Bird Conservancy, where we will establish the infrastructure needed to implement this ranching model. These funds will be used to create paddocks for a rotation system as well as the full establishment of a corral where cattle will be managed. This is a big step for the economic sustainability of the reserve to ensure unrestricted funds for our conservation activities.

Tjalle Boorsma together with Armonía's executive director, Rodrigo Soria-Auza, visited the 7<sup>th</sup> cattle ranching congress organized by the Alianza del Pastizal in Virasoro in the Corrientes Department of Argentina. Prior to this congress, we travelled together with the Alianza del Pastizal, American and South American conservation players and key conservation donors through Uruguay, Brazil, and Argentina to visit ranches that are part of the sustainable cattle practice alliance. The goal of this trip was to talk about future grassland protection, experience first-hand the positive effects of the alliance and brainstorm about future steps to implement sustainable cattle management alliances throughout the Americas.



Figure 12: Tjalle Boorsma together with key grassland and bird conservation donors (Greg Butcher from US Fish and Wildlife left from Tjalle and Guy Faulks from NMBCA right from Tjalle) visiting ranches that are part of the Alianza del Patizal in Argentina. Picture taken by Alianza del Pastizal.



## Research

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### *Blue-throated Macaw population monitoring: Highest count ever*

The highest ever recorded number of Blue-throated Macaws has been observed in the Barba Azul Nature Reserve. While collecting vital Blue-throated Macaw data for his master thesis study, Fabian Meijer (Dutch forest and nature conservation student from the Wageningen University) counted 118 Blue-throated Macaws arriving at their roost in the far north of Barba Azul North. Fabian was collecting data on the Motacu forest islands to study which environmental factors play a role in the distributions of Blue-throated Macaws at Barba Azul. Each night he was positioned at the known roost to count the birds. The first nights he counted between 90 to 110 birds, followed by the highest ever count of Blue beards on his final night.

Many pairs have been observed with up to 2 successfully raised chicks indicating that the Barba Azul Nature Reserve population is slowly growing. It is also good to remember and to be assured that the reserve is protecting the most important foraging location and their historical roosting islands, as they return each year faithfully to the reserve. What we still don't know is where they breed during the wet season. This will hopefully be resolved after the January/February on-ground Blue-throated Macaws breeding location search, executed by Tjalle Boorsma.



Figure 13. Highest recorded count ever of Blue-throated Macaws in the Beni were observed in the Barba Azul Nature Reserve by Fabian Meijer, a Dutch forest and nature conservation student executing his master thesis in the reserve. Picture taken by Sebastian Herzog,

### *Buff-breasted Sandpiper population monitoring: Highest count ever*



Not only have we had the highest count of Blue-throated Macaws at Barba Azul Nature Reserve, but also the highest record ever of Buff-breasted Sandpipers coming down to forage at the river-edge shortgrass habitat during their fall migration to the pampas of Argentina. A day count of over 1450 individual Buffies on the 8<sup>th</sup> of September at the Tiniji river system, was registered by Teodoro Camacho, one of the field team members of the annual Buff-breasted Sandpiper monitoring and research group funded and supported by the Neotropical Migratory Bird Conservation Act from the US Fish and Wildlife Service.

This year we have been adding the experimental factor to the annual data collection of Buff-breasted Sandpipers as well as searching for new potential monitoring sites within the reserve. We were also interested in the exact period of Buff-breasted Sandpiper using the reserve as their critical stopover sites. Therefore, we had 5 students from the Cochabamba University collecting vital Buffy data. One of them spent a full month (instead of the 2-week monitoring period) to evaluate to peak in foraging.

Preliminary results show that the peak of Buffies arriving at Barba Azul starts in the second week of September as well as high numbers at the end of September. It is also hypothesised that this is correlated to heavy rainfall and wind from the south. Two significant rainfall periods arrived at the reserve, showing a peak in abundance and indicating an approximate 3-day stopover period before continuing their migration to the south. We also discovered that the Tiniji watershed site is of extreme high importance for Buffies to forage, though not yet included in the annual monitoring program.

Figure 14. Buff-breasted Sandpiper (*Calidris subruficollis*) at river-edge short grass habitat in the Barba Azul Nature Reserve. High numbers of Buffies are correlated to heavy rainfall as well as high cattle abundance. Picture taken by Fabiola Baya.





During the annual monitoring, we also collected additional data on the presence/absence and abundance of grazing animals, differentiating between area with cattle and horses. Areas were subdivided in High & Low cattle stocking rates, no Cattle/Horse presence, Horse presence and no grazing. Cattle stocking rate was related to number of animals observed as well as the number of dung piles (followed by daily counts of new dung piles in the same plot).

Preliminary results indicate that high abundance is correlated to medium to high stocking rates of cattle. Cattle keep the grass at the preferable height for Buffies to forage. We are interested in whether the dung presence has a positive effect on the food availability. We have been managing experimental plots where we mowed the grass to create that short grass favorable habitat. Though no Buff-breasted Sandpipers have been observed in these areas. Also, recently burned areas in the far north of Barba Azul North did not indicate to have a positive effect on Buffy abundance. In North America, the general assumption is that Buff-breasted Sandpipers prefer recently burned areas.

We will construct our cattle ranching model at Barba Azul East where we will establish a paddock grid where cattle will be rotated over short period to better manage the grassland, we can experiment with different stocking rates in different areas. As well as having areas with high dung availability though absence of cattle. This will better answer the question what influences the presence of Buff-breasted Sandpipers in their stopover habitat, to ensure improved management actions to protect Buffies in these crucial areas.



Figure 15: Cattle at the Tiniji area of Barba Azul East that we rent to a neighbour rancher. Their favorable grazing habitat is the river-edge short grass habitat, the same habitat the Buff-breasted Sanpiper use. Picte taken by Tjalle Boorsma



### *Barba Azul Nature Reserve 2016 “Big Day”: Astonishing new record*

The old Barba Azul Nature Reserve “Big Day” record (highest number of birds seen in one single day) set by Bennett Hennessey and Tjalle Boorsma in May 2015 of 132 birds has been conquered and crushed by Fabian Meijer and Tjalle Boorsma this September. A total of 179 birds were seen in one single day. This season is extremely diverse in avifauna as North American migratory birds are arriving and the Southern migratory birds are still lingering around. The complete September “Big Day list” can be viewed on e-Bird: <http://ebird.org/ebird/view/checklist/S31961102>.

This search for birds was well planned to ensure the visit of all microhabitats within the Barba Azul Nature Reserve at the right moment of the day, nevertheless this day list clearly indicates the value of the reserve and this threatened ecosystem as it is teeming with birdlife. All threatened and Endemic species of the area have been seen including a wide range of North American migratory species. The Armonía website published the full story on their webpage: <http://armoniabolivia.org/2016/10/24/big-day-at-barba-azul-nature-reserve-new-record-of-179-species-in-one-day/>.



Figure 16: Tjalle Boorsma and Fabian Meijer conquered and crushed the old “Big Day” record of 132 birds with the astonishing number of 179 birds seen in a single day. Picture taken by Esther van Nissen.



*More than 300 birds registered at Barba Azul Nature Reserve*

On September 30<sup>th</sup>, Fabian Meijer registered the 300<sup>th</sup> bird species for the reserve. It was not the most exciting bird you can imagine, but the Blue Ground-Dove is number 300 for the Barba Azul Nature Reserve. Other species like the Double-toothed Kite, Great Antshrike, Red-bellied Macaw and the incredible King Vulture have been observed for the first time this years in August and September. The complete list of birds can be checked on e-Bird: <http://ebird.org/ebird/hotspot/L1133586>.



Figure 17: Great Horned Owl was first observed in July 2016 and was one of the highlight birds during the September “Big Day”. Picture taken by Fabian Meijer.



## Tourism

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### *Complete tourism infrastructure*

All four cabins at Barba Azul Nature Reserve have been successfully improved with extended roofing and improved mosquito netting closing all entrance possibilities for bugs and critters. This project was part of the long-lasting support we obtain from the American Bird Conservancy. With the increased roofing, we also ensure a cooler climate as no direct sunlight is entering the cabins. We also improved the cabins with self-made tables and shelves, as well as hangers for clothing and door springs to make the cabins more comfortable.

In November 2015, all cabins as well as the field station were provided with portable windows built by Andele Boorsma (Barba Azul Nature Reserve coordinators' father) to ensure a quick and highly successful method to prevent rain from entering the field station. After a full year of usage, no maintenance was needed and the idea is adopted by neighboring ranches as well.

We also decided to fully improve the mosquito netting of the field station to ensure a bug free dining area to guarantee a comfortable area for tourists, investigators, and students to have their meals. Additional maintenance activities to fully improve this part of the Barba Azul Nature Reserve's infrastructure are planned for 2017.



Figure 18 & 19. Cabin 4: Before and after cabin improvements. Improvements are extended roofing, smaller mesh mosquito netting and portable windows. Pictures taken by Tjalle Boorsma and Oscar Yabeta respectively.