

**Programme for Belize  
Monitoring and Protection Summary  
Rio Bravo Conservation and Management Area FY 2022**

Below is a summary of the monitoring and protection program which aims to prevent any illegal unauthorized activities and to preserve the biodiversity, environmental and cultural characteristics of the Rio Bravo Conservation and Management Area owned and managed by Programme for Belize.

Programme for Belize (Pfb) is a private, non-profit, Belizean conservation organization established in 1988 and is dedicated to conserve biodiversity and promote the sustainable development of Belize’s natural resources through the proper management of the Rio Bravo Conservation and Management Area (RBCMA) and other lands entrusted to it. The RBCMA is the flagship project where Pfb puts into practice its management principles based on the Man and Biosphere Reserve Principle. Approximately 60 % of the reserve is managed as a strict preserve. Sustainable economic activities, such as tourism and sustainable timber harvesting, are being implemented in the remaining buffer area with the goal of demonstrating sustainable development and producing as sustainable stream of revenue that contributes to the management and protection of the entire reserve.

**Land Tenure**

Programme for Belize has ensured the integrity of all the lands entrusted to it under the Memorandum of Understanding between the Programme for Belize and the Government of Belize through the constant monitoring of the RBCMA’s perimeter via aerial patrols, land/boundary patrols.

**Resource Management and Protection**

In 2022 The Programme for Belize (Pfb) rangers conducted 615 patrols and related assignments which included Protection, Outreach, Training activities and other administrative duties with most of their efforts being dedicated in conducting patrols aimed at deterring resource loss. A total of 142 patrols and support activities were coordinated and executed along with rangers from the Belize Maya Forest Trust within their area of control. The arrangement to work along with the BMFT rangers has provided our teams an opportunity to partner and learn from them and more importantly it has built a very strong working relationship with our new conservation partner. At the end of 2022, Programme for Belize will have finished any official coordination and support work agreed with BMFT but will continue to partner in efforts that mitigate and protect the natural environment of the surrounding area. The table below details the patrols by section that were conducted within BMFT and the Rio Bravo for the year 2022.

| Row Labels                   | Belize Maya Forest | Hill Bank Field Station | RBCMA-Gates | Grand Total |
|------------------------------|--------------------|-------------------------|-------------|-------------|
| Aerial Patrol                |                    |                         | 2           | 2           |
| Day Patrol                   | 88                 | 8                       | 205         | 301         |
| Fire Response                | 12                 | 5                       | 29          | 46          |
| Joint Operation              | 1                  |                         | 9           | 10          |
| Logistics Support            | 4                  | 3                       | 46          | 53          |
| Night Patrol                 | 11                 | 2                       | 65          | 78          |
| Over-Night Patrol            | 5                  | 2                       | 11          | 18          |
| Road and Signage Maintenance | 4                  |                         | 16          | 20          |

|                                     |     |    |     |     |
|-------------------------------------|-----|----|-----|-----|
| Surveillance                        | 1   |    |     | 1   |
| Survey Line<br>Cleaning/Maintenance | 14  |    | 25  | 39  |
| Training                            | 2   |    | 7   | 9   |
| Yellow-headed Parrot Monitoring     |     | 1  | 37  | 38  |
| Grand Total                         | 142 | 21 | 452 | 615 |

**Illegal Logging/Illegal Hunting:**



During the year, the rangers conducted a total of 397 patrols including day, night and overnight patrols that were mainly aimed at deterrence of illegal logging and hunting, which are the main illegal incursions within the Rio Bravo Reserve. This total number of patrols accounts for more than half of the total patrols done in 2022 and highlights the importance of being active and present in the different hotspots on an almost daily basis. One of these hotspot areas for illegal logging is an area within the San Felipe Savannah known as Cornelius where Mahogany trees are large and can be cut and extracted during the dry season. In June of 2022, our rangers located a tractor with trailer laden with recently cut trees near the reserve. After following the tractor and calling for police support, the driver and his tractor and trailer were stopped, and all items confiscated. This was one such example of constant patrols and coordinated efforts with law enforcement to deter and punish illegal logging within our area.

**Joint Operations/Aerial Patrols:**

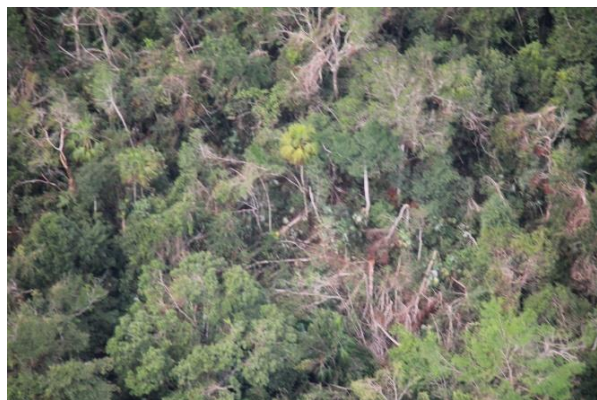
Joint Operations allow our rangers to plan target specific hotspots and time periods when they know illegal activities like illegal fishing, illegal logging or hunting may be happening. These Joint Operations also allow for persons in the area to see that law enforcement units including the Forestry Department, Police, Belize Defence Force, Fisheries Department are working in coordination and in support of our efforts at combating these unwanted activities.

On few occasions our rangers can interject an ongoing illegal activity on the ground such as illegal logging. With the assistance of the Blue Creek Police and the Belize Defense Force soldiers we were able to stop one such illegal logging operation by one repeat offender. On Wednesday 28 December 2022, Programme for Belize Rangers conducted a patrol at Johnny Sand area where they heard a chainsaw. One person by the name of Sigfredo De Jesus Mojica Duarte was found at this location and detained while another male person escaped. Beside the detainee was a Stihl brand chainsaw and a mahogany log that was being cut into flitches. After checking the area for further evidence, the patrol team located 9 pieces of mahogany flitches

plus a mahogany tree that was cut into 2 pieces of log. While coming out of the area, approximately 150 meters from where Mr. Mojica was detained, the patrol also found another 21 pieces of mahogany flitches. Mr. Mojica was detained, processed, and taken to the Ornge Walk Police Station where he would later have to report back for a court case regarding this incident.



Aerial patrols are limited in their use for budget purposes but are crucial in making a full-scale assessment of the reserve and its surroundings. We try to mount a patrol in each quarter when possible or in the case of this year, when necessary. The impact of hurricane Lisa on the southern section of the Rio Bravo on November 2<sup>nd</sup> caused damages to the vegetation that could only be properly assessed through aerial views. i.) On 17 November 2022, an Aerial Patrol was conducted over the Rio Bravo Conservation Management Area (RBCMA). The main objective of the patrol was to check on damages to the Forest, i.e. logging compartments of the Sustainable Timber. The aerial patrol assessed the damages caused by Hurricane Lisa to the Savannahs, Broad Leaf and Bajo Forest along the southern half of the Rio Bravo reserve and surrounding area.





In the long-term, Pfb and forest researchers will be able to study how the trees inside the treatment plots are reacting and developing over the years due to the silvicultural intervention and compare that information attained with the growth and mortality and recruitment process of trees inside forest plots that did not receive the treatment. It should provide important information for ensuring the long-term sustainable productivity of the timber forest of the Rio Bravo Conservation and Management Area.



### Yellow-headed Parrot Monitoring and Research:

The Rio Bravo Conservation and Management Area is the stronghold for Yellow-headed Parrots (YhP), *Amazona oratrix belicensis* in Belize. As such, Programme for Belize dedicates a significant number of efforts to monitor and protect the Yellow-Headed Parrots during the breeding season to protect it from poaching and to ensure a successful breeding. Data on the nesting population of Yellow-headed Parrot was collected by Programme for Belize rangers between the months of March to June of 2022. Last year 2021 we had support from the Belize Bird Conservancy team who provided 2 volunteers for that monitoring season, but this year Programme for Belize did not

receive any such assistance from any outside group. During the four months of this monitoring period, the rangers also monitored nest cavities, recorded fledging dates, and conducted general protection of the nest sites and other wildlife within the Rancho Dolores Pine Savannah.

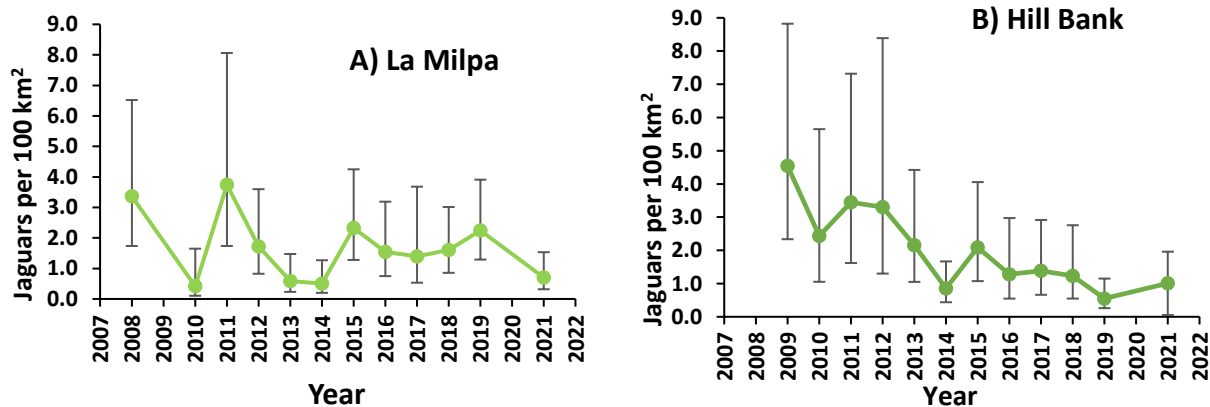
The results for this monitoring season include a total of 47 nests that were monitored. Of these 26 nests fledged young birds, 1 nest which had 2 young birds filled with water and were drowned, 4 nests were altogether abandoned and 16 nest were predated by spiny tailed iguanas, snakes, and birds of prey. The increased ranger patrols and overnight camping contributed to the fledging success of this year by deterring poaching which is one of the main threats.

### Jaguar Population-Remote Camera Monitoring Project



In 2021, researcher Dr. Marcella J. Kelly from the Department of Fish and Wildlife Conservation, Virginia Tech University, USA, and her field team conducted the first jaguar surveys since the start of the Covid-19 pandemic. Camera trap surveys were conducted within the Rio Bravo Conservation and Management Area (RBCMA), at both La Milpa Lodge and Hill Bank Field Station. A total of 72 camera stations were set up in RBCMA with each camera station having two cameras on opposing sides of roads, old logging roads, trails, and game trails. This method allows for the capture on both sides of a jaguar (right and left) and to be able to develop a database of known individuals. These camera stations were spaced ~2-3 km apart and operated 24-7 between the dates of July 28-12 October at La Milpa and between June 02-06 August at Hill Bank. A total of 4,724 trap nights was accumulated within the RBCMA from May to October 2021 (Table 1) resulting in 182 photo capture events that totalled 17 individual jaguars (10 males, 7 females). The project also photographed and identified 3 new individuals in RBCMA including 3 males and 1 female. In La Milpa, the density estimates via SECR models in 2021 was lowest at 0.70 (CI: 0.32-1.53) jaguars per 100 km<sup>2</sup>, while at Hill Bank it was intermediate at 1.01 (0.05-1.96) jaguars per 100 km<sup>2</sup> (Figure 1). Long term density data do not show evidence of an increasing or decreasing trend, but it should be noted that in the early years (especially 2008-2012) point estimates were higher. The research finds little evidence that jaguar densities were different in RBCMA in the areas currently or previously experiencing sustainable timber extraction.

| <b>Table 1.</b> Summary of number of individual jaguars captured and sex of individuals within La Milpa and Hill Bank for the 2021 camera-trapping survey in Northern Belize, Central America. |                           |                             |              |                |                    |                         |
|--|---------------------------|-----------------------------|--------------|----------------|--------------------|-------------------------|
| *Column total do not include jaguars that cross over from one site to the next   |                           |                             |              |                |                    |                         |
| Site   | Number of camera stations | Jaguar Photo Capture Events | Jaguar Males | Jaguar Females | Jaguar Unknown Sex | New Individuals in 2021 |
| La Milpa   | 27                        | 82                          | 4            | 3              | 0                  | 3                       |
| Hill Bank  | 45                        | 100                         | 6            | 4              | 0                  | 1                       |
| <b>Totals</b>  | <b>72</b>                 | <b>182</b>                  | <b>10</b>    | <b>7</b>       | <b>0</b>           | <b>4</b>                |



**Figure 1.** Annual jaguar density estimates (per 100 km<sup>2</sup>) calculated with spatially explicit capture-recapture (SECR) models A) La Milpa, and B) Hill Bank in 2021.

## Capacity Building and Training:

### Training:

Training of the fire management team is provided annually at the beginning of the fire season. In preparation for this year's fire season, we conducted training at Hill Bank Field Station to build and reinforce the capacity in forest fire management for all of our rangers and forestry staff. Topics covered at the training included fire preparedness, suppression tactics, fire prevention, fuel loads, controlled burns, developing burn plans and practical exercises. Participants included instructors Mr. Ramon Pacheco and Head Forester Richard Balan, 24 staff from Programme for Belize (rangers and forestry crew) including station manager and technical coordinator and 2 Belize Maya Forest rangers. Training began on February 28 with an entire day of theory but when preparing to go and build fire lines at the savannah, heavy rainfall caused the exercise to be postponed. From March 17-18 all participants returned to prepare fire lines within the Rancho Pine Savannah. Subsequently, on March 19 the official prescribed burn was conducted with a total area of 2,230 acres being burned.



Figure 4: Fire Management Team building the fire line.

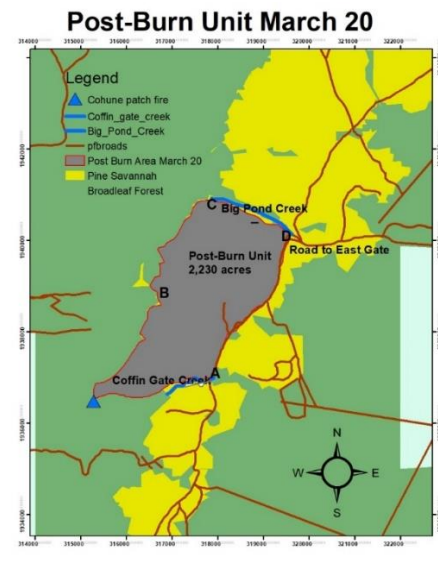


Figure 6. Post-Burn Map of prescribed burn area

### Capacity Building:

PAWS training was held at Hill Bank Field Station from the 8 – 11 August 2022 with participation from both Programme for Belize (PFB) Protection personnel and Wildlife Conservation Society (WCS) staff. The focus on the training was the introduction to PAWS as a tool to assist in patrol planning. The training exercise reiterated the need to input as much data as possible. The exercise also gave additional practice for the Rangers to enter data in the devices. The training was both theoretical and practical. The overall exercise was beneficial to the Rangers to practice entering data in their devices and the use of SMART. It was also an opportunity for the WCS representatives to experience the challenges in the field and glitches in the SMART Programme.





PAWS training participants out in the field practicing with the use of their SMART devices.

### **Fire Detection and Suppression:**

During the 2022 fire season, monitoring and enforcement was carried out in and around the Rio Bravo Conservation including the San Felipe Savannah, the Lemonal Boundary Savannah and the Yalbac Area. Monitoring is done at least two times daily through the fire observation tower at the East Gate and through increased patrols in these fire prone areas.



Figure 11: Rangers suppressing fire ignited by suspected illegal loggers in the Driving Camp Area of the San Felipe



Figure 12: Driving Camp area after fire has swept through.

The areas known as Driving Camp, Wiral, Duck Ridge and Triangle had the most fire threats this fire season. Some Mennonite farmers continued to clear their lands around and near the RBCMA lands thus increasing the risk and causing some of the agricultural fires our fire response teams had to confront this year. The rangers deterred illegal logging activities within the reserve, and this then resulted in the suspects of illegal logging to retaliate by lighting fires within the San Felipe Pine Savannah. The suspected arsonists kept the rangers engaged and this provided them with more opportunities to carry out illegal logging and hunting activities.

## **Conclusion:**

The protection program and team are a vital link in ensuring that the resources of the Rio Bravo remain intact. Their regular patrols and monitoring of the hotspot areas continue to ensure that there is minimal damage in terms of illegal logging, poaching, fishing, and fire incidences within these areas. The training received throughout the year including the rangers' training in Fire Management, Policing Tactics and the use of the SMART system ensure that they are capacitated in conducting the work that is at hand. The provision of field equipment and ranger gears have greatly enhanced the protection capacity of Programme for Belize and improved the efficiency of the rangers. The support Programme for Belize receives from its neighbouring communities like San Felipe, Blue Creek, San Carlos and Indian Creek allow for our ranger team to respond quickly and appropriately to many situations that would otherwise be more difficult to work with. These include instances of illegal fishing along the Irish Creek area or fires being spotted along the reserve border near Indian Creek and San Felipe.



*Rangers along with Forestry personnel at the end of 2022 prescribed burn at Rancho Pine Savannah*