



Protected Areas Management Program

Second Quarter Report, 2013

April 1st to June 31st

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Enforcement

The second quarter is the time of year when illegal activities peak inside all protected areas in the Maya Golden Landscape (MGL). Given the dry weather all trails become accessible, including the Bladen Nature Reserve (BNR) access road, hunting conditions are improved and the rivers are crystal clear for striking fish. As in previous years we have seen spikes on weekends and particularly on public holidays.

The dry weather this quarter was a major influence on our activities, we experienced one of the driest periods seen in the past 20 years according to local community members. This drought led to increases in illegally started wildfires in the savannah (Deep River Forest Reserve and Payne's Creek National Park) compared to previous years, and along roadsides throughout the MGL.

The greatest impact from the fires was to broadleaf forest which, unlike savannah, is not adapted to frequent fires. The major cause of these fires in broadleaf forest was escaped agricultural fires, particularly from milpas (slash and burn). The broadleaf fires affected forest in community lands and also in protected areas, significantly in Golden Stream Corridor Preserve (GSCP, 78 acres lost) Maya Mountain North Forest Reserve (MMNFR) and Columbia River Forest Reserve (CRFR, 850 acres lost primarily around Indian Creek and Medina Bank farmland). It is important to note that broadleaf forest takes much longer to recover from fire disturbances, particularly in these forests which were heavily impacted during hurricane Iris in 2001 (>90% canopy loss in GSCP).

BNR was not affected by fires despite a similarly dry forest and high risk weather. The primary reason for this is the lack of human activity and particularly agriculture adjacent. Xatero activity was suspected to have either decreased or have shifted in its access routes after a Ya'axché-BDF joint patrol in April discovered established trails (originally identified in 2009) were overgrown and apparently unused for at least 6 months. These trails which had originally been used for transport of xaté with horses led toward the Snake Creek valley, where a major Xatero camp was discovered in 2012. The PAM team will follow up with a patrol further up the Central River valley in the third quarter to determine whether activity has decreased or just shifted.

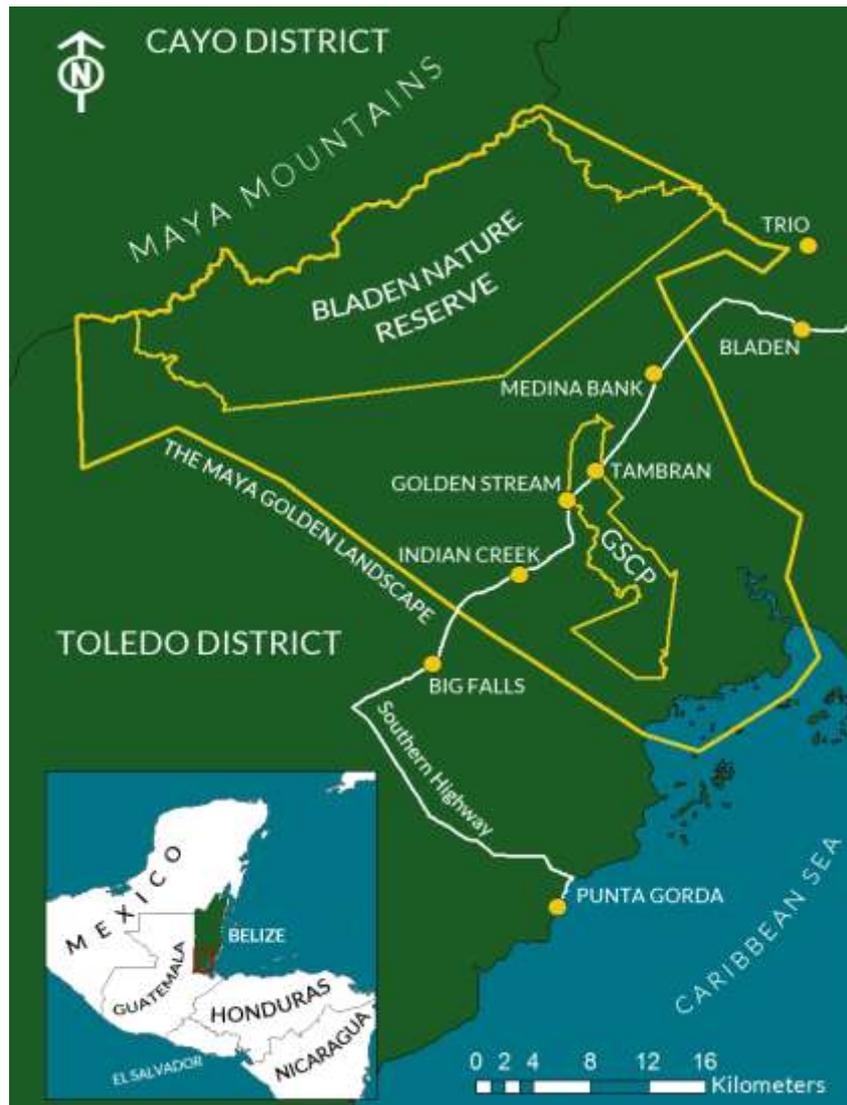


Figure 1. The Maya Golden Landscape – The focus area of Ya'axché

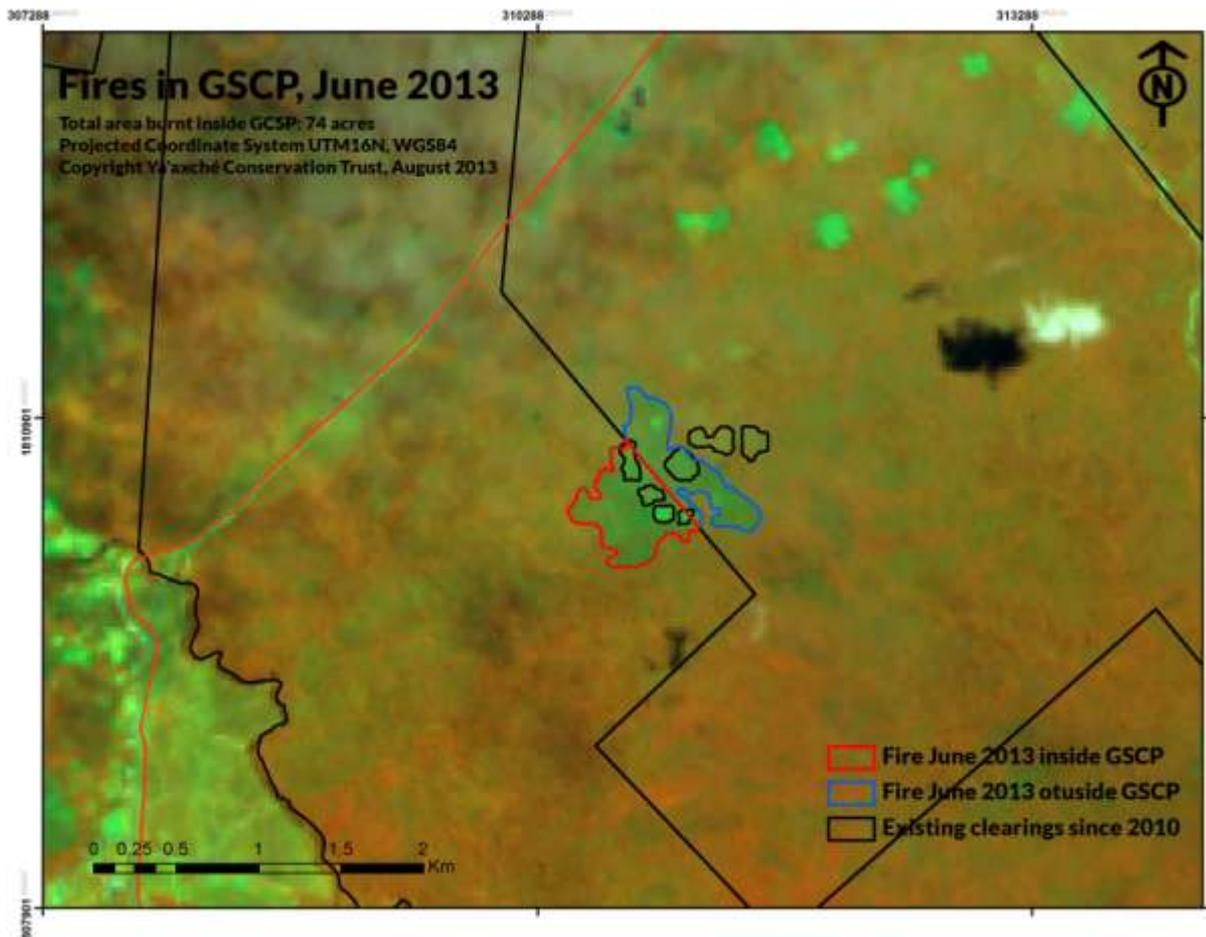


Figure 2. Burned area in red is inside GSCP and outside, on national lands, in blue.

2nd quarter patrol data analysis

In Table 1 the number of patrols and man-days spent patrolling is displayed. In comparison with 2012 we conducted a similar amount of patrols in BNR and GSCP during the same period. This can be improved on in 2014 with more efficient use of temporary rangers for this season which sees the peak of activity.

Three deep (multi-night patrols) were conducted in GSCP and BNR in the 2nd quarter. These patrols, ranging between 2 and 6 days duration, covered a variety of objectives including reconnaissance for Xatero activity, investigation of newly opened illegal hunting trails and transect monitoring. These types of patrols are specially targeted to deal with arising threats or unexpected/unplanned activities, and research and monitoring.

The ranger team also stepped up on night patrols through this dry season in order to try to tackle the increase in illegal night fishing activity along the Bladen River inside the Bladen Nature Reserve. The deep pools of the Bladen Branch River are of critical importance in restocking the heavily fished downstream sites outside the Bladen Nature Reserve.

Patrol statistics

Table 1. Number of patrols carried out in Bladen Nature Reserve, Maya Mountain North Forest Reserve, Cockscomb Basin Wildlife Sanctuary and Deep River Forest Reserve.

	April	May	June
No. of patrols	22	27	24
Man days worked	51	63	51

Table 2. Number of patrols carried out in Golden Stream Corridor Preserve and Columbia River Forest Reserve.

	April	May	June
No. of patrols	27	26	16
Man days worked	73	75	39

Incidents and analysis

There were two major incidents in GSCP in the second quarter, the first concerned the logging of rosewood near the Hope Creek boundary line. The perpetrator was discovered after some investigative work by the rangers on duty. The matter was resolved without punitive action. The second concerned a major fire that was set outside of the PA in a milpa from an unidentified resident of the adjacent Tambran community. This fire burned an estimated (according to satellite images and collected GPS points, see Figure 2.) 74 acres inside. A full ranger team worked for more than 4 hours to prevent the further spreading of the wildfire.

There were three major incidents in the second quarter in BNR. The first, in April related to an intentionally set fire which was clearing land, apparently illegally, along the Bladen River in the Deep River Forest Reserve. This fire reached the southern boundary line of BNR and is of great concern as the first potential agriculture to reach the border of the reserve. The second incident was the discovery of a hunters camp by the Ek Xux valley in BNR's central sector, this is of concern given the presence of archaeological sites in the area however there was no evidence of looting, it is also of significant distance from the village (2 days hike). Third, hunting and fishing evidence discovered in April highlighted that groups of fishermen/hunters are still entering the reserve at night. This guided the ranger team in targeting patrols to address this and numerous night patrols were conducted to prevent further activity.

Interagency Collaboration

A Joint patrol was conducted to BNR west between Ya'axché and BDF in April, this was also supported by the commitment of BDF to provide soldiers on a rapid call response in case of necessary arrests in the BNR east. One of the issues preventing successful use of this offer was the lack of vehicles between both Ya'axché and BDF.

Of particular note is the revitalization of the interagency meetings under the BDF 2nd Battalion who have demonstrated an impressive commitment to generating the enthusiasm among southern enforcement agencies in meeting each month to discuss enforcement needs, share information and identify areas for collaboration and resource sharing.

Belize Audubon Society rangers joined Ya'axché rangers on two occasions in the second quarter to patrol the southern Cockscomb Basin Wildlife Sanctuary (CBWS)

and adjacent Maya Mountain North Forest Reserve (MMNFR). Increasing illegal activity in the MMNFR from illegal logging and illegal cattle ranching and milpa is advancing ever closer to the boundary of BNR and CBWS.

Friends for Conservation and Development (FCD) have been very supportive of Ya'axché's efforts to increase the capacity of our ranger team. Through discussions with Protected Area Manager, Derric Chan, Ya'axché was able to send two rangers on an 8 day standing patrol at Ceibo Chico conservation post in a major conflict zone of the Chiquibul NP. This is expected to expose the rangers to a much more militarized enforcement experience and increase capacity to deal with the growing threats south of the Maya divide.



Figure 3. *Fires burning in the Columbia River Forest Reserve indicate the dangers of agricultural fires for forest health in periods of drought (Photo credit: Adam Lloyd)*

Biodiversity Research Inventory and Monitoring

Monitoring

Ya'axché's long term monitoring program, now in its 7th year, continues to focus primarily on birds and mammals, with continued sampling of snails, bats, weather and permanent sample plots for trees. Training in refining field data collection techniques and also training of field staff to input data directly into databases, and sort field collected samples has continued into 2013 and we have observed significant improvement in the efficiency and effectiveness of our monitoring systems. Each ranger team is able to independently go out, collect transect data according to set protocols, return to the ranger base and enter directly into computerised databases. Ultimately the strengthening of these systems and the subsequent strengthening of the analysis, will contribute to better decisions regarding the management of the BNR and GSCP.

This data which has accumulated over the past 3 years is currently being analysed by Maarten Hofman (Ya'axché's Research Coordinator), who completed the report for 2010 data in the second quarter of 2012. The 2011 report was completed in the fourth quarter of 2012 and has been disseminated to our partners and presented to the PAM team. The 2012 report is scheduled for completion by the 3rd quarter of 2013. The goal of these reports are to enable comparison of biodiversity among years to inform management decisions, and equally important, to record and illustrate the development of the monitoring program at Ya'axché since its inception.

Our 10 long-term transects, which are used to monitor birds and mammals that have been selected to provide indications of population, threat and ecosystem health trends, continue to be visited bi-monthly by the ranger team according to the pre-determined schedule. Our efficiency in reaching to all the transects at regular intervals has continue to improve and we have completed 100% of transect site visits in 1st and 2nd quarter of 2013, this will result in more robust data for analysis in the future abovementioned reports.

In the two permanent vegetation sample plots, on karstic slope and ridge located in eastern BNR field work has not been active in the second quarter. Steven Brewer (plant ecologist, BFREE) and Ya'axché's botanist Gail Stott, have effectively completed collection and identification of voucher specimens in the slope plot and Brewer has been working on remaining species determinations in the herbarium at Missouri Botanical Garden. To date, there are 106 confirmed species within the one-hectare slope plot. These data suggest a particularly high level of tree species diversity for northern Central America. Funds have been secured from PACT to complete identification of species in the ridge plot in February 2014.

Ya'axché's snail monitoring has continued into the second quarter of 2013. All leaf litter samples taken in 2012 were analysed and sorted to species level by the trained members of the Ya'axché ranger team. Their species identification was cross checked by Dan Dourson, resident biologist and malacologist at the Belize Foundation for Research and Environmental Education (BFREE). Both data sets are currently being entered in a series of excel worksheets and will be analysed to be included in the 2012

Biodiversity Report. There has been additional plot set up in GSCP in the northern sector near the foothills. Samples taken here are currently being analysed by rangers Marcus Cholom and Marcos Tut.



Figure 4. Marcus Cholom uses a densiometer to estimate the canopy cover in one of the snail monitoring plots. The cover for the plot is calculated as the average of estimates at three locations in the plot.

Research

Research activities in the second quarter have included a continuation of the bird banding program by the Avian Monitoring Team from BFREE and the monitoring of the harpy eagle chick and breeding pair of adults at Quebrada de Oro valley. A review of unexplored and data deficient cave systems in central and eastern BNR was conducted by the South Wales Caving Club which is the first step in a systematic approach to mapping the cave entrances and systems in Bladen Nature Reserve, they investigated 30 caves, some of which were part of the same systems. Further investigation of these caves will be conducted in 2015.

A research team from UC Davis has been investigating “*Coupled carbon, nitrogen, and phosphorus cycles on volcanic and limestone substrata in the Bladen Nature Reserve, Belize*”. A preliminary report suggests that soil P (phosphorus) may drive N (nitrogen) fixation – the principal Nitrogen input to natural ecosystems – and therefore may be

the ultimate constraint on productivity and Carbon sequestration in tropical ecosystems. Research will continue in the fourth quarter of 2013.

Further research was conducted in the Quebrada de Oro valley by Marc Abramiuk (who was part of the extensive Maya Mountain Archaeological Project in the 1990's). Along with a film crew, in the quest to find as yet undiscovered stelae he discovered a causeway linking some of the previously known structures, likely from the same Late Classic Period, circa 900CE.

Ranger training

Whilst there was no internal ranger training conducted in the second quarter Ya'axché had the chance to finally implement the first pilot of the National Ranger Training Academy in June. Hosting 7 rangers, primarily from smaller community based NGO's, the three day course covered the basic concepts of conservation, the role of the ranger and patrol and monitoring techniques. The participants were able to visit GSCP and BNR observing Ya'axché's rangers in the field. There is a further training planned for the third quarter.

Education and outreach

In the 2nd quarter of 2013 Ya'axché has continued the efforts of 2012 to raise awareness of the benefits of protected areas such as the provision of ecosystem services including clean water, game stock replenishment, pest control and rainfall generation. In addition to this the boundaries of the protected areas are demarcated and well known in the buffer communities. Communication remains strong between Ya'axché's Protected Areas Management program and the Community Outreach and Livelihoods Program as we try to find the balance between conservation and development.

Film production

Ya'axché was proud to complete its short film 'The cohune, the gibbon & us'. This film explains the concept of biodiversity and what an ecosystem is, and why we humans need to take care not to break the links in the forest ecosystem. The film was shot on location entirely in Belize and features staff and community members from the Maya Golden Landscape.

Community clean-up campaign

Medina Bank village and Golden Stream village were again assisted in a community clean-up campaign. Students from the schools collected trash from around the community centre, school and along the river banks.

Student group visits

We had visits from diverse groups of students, both national and international. The Caribbean Community Climate Change Centre, University of the West Indies, Colorado State University, and local high schools the Toledo Community College and Julian Cho Technical College.

Community open forum

Farmer forums continued in 6 villages, Golden Stream, Indian Creek, Medina Bank, Big Falls, San Miguel and Silver Creek. At these forums farmers were able to find out about the programs that Ya'axché is involved in, find out about the values of forests, why BNR and GSCP are protected, and also to be introduced to the MGL 'Farmer of the Year' award.

Farmer of the Year Award

The First Annual MGL Farmer of the Year Award was held last Friday, May 24th, 2013 at the school grounds in Indian Creek Village. It was a fun filled day of activities and giving recognition to farmers who work so hard developing cacao based agro forestry farms. First Prize Winner was awarded to Santiago Cus from San Miguel, Second Prize Winner: Leonardo Cucul from Big Falls, and Third Prize Winner: Hubert Cus from San Miguel.

Regular school visits

Ya'axché's education and outreach officer, Julio Chub, conducts regular awareness raising visits to schools in Ya'axché's buffer communities, 6 community schools have been visited at least once in this second quarter.

Community educational visits

Womens groups in Big Falls and Indian Creek were given training on community development planning and business and marketing. In Medina Bank the community group, Tzimin Che, were educated about the importance of watershed protection.

Tapir awareness

Tapir awareness materials competition introduced to two high schools. The winning entry was a song which highlights the beauty, importance and ecology of the national animal of Belize.

Work plan for third quarter

Table 3. Work plan for third quarter 2013.

	July	August	September
Patrols in GSCP, BNR, CRFR and DRFR	X	X	X
Transects in GSCP, BNR, CRFR	X	X	X
Joint patrol to western and central BNR		X	
Weather station data collection	X		
Ranger training academy		X	



Figure 6. Students from Indian Creek RC school compete in the cacao sack race, this was one of many fun events at the first annual Farmer of the Year award, this award is presented to the farmer who has shown the greatest commitment to sustainable practices (Photo credit: Erik Hammar)

Annexes

The following are the products of the databases which are mentioned above. The methodology and rationale for the chosen focal species which are featured in the tables below can be found in the Biodiversity Synthesis Report 2011 (available from yaaxche.org). These results will be analysed at the end of the calendar year, and relevant and illuminating information which can be drawn from the analysis will, where possible, directly inform Ya'axché's management decisions.

Key to transect codes

Transect codes consist of an area abbreviation (e.g. 'BNR') followed by a number. Abbreviations are as follows

- BNR – Bladen Nature Reserve
- CRFR – Columbia River Forest Reserve
- GSCP – Golden Stream Corridor Preserve
- IV – Indian Creek Village (community lands transect)

Numbers represent the sequential number of the transect.

Transect bird totals

Ya'axché monitors a specific list of indicator species which have been selected according to their capacity to help Ya'axché answer specific questions about the relative ecological health of the Maya Golden Landscape. This list and rationale for the species inclusion is outlined in the table below.

Species	Rationale for monitoring
American Redstart	Migratory quality
Black and White Warbler	Migratory quality
Blue-gray Gnatcatcher	Migratory quality
Bronzed Cowbird	Brood parasite - follows disturbance e.g. cattle
Brown hooded Parrot	Forest health
Cerulean Warbler	Migratory quality, vulnerable status
Chestnut-sided warbler	Migratory quality
Common Yellowthroat	Migratory quality
Crested Guan	Disturbance + lack of hunting indicator
Dickcissel	Migratory quality
Golden-winged Warbler	Migratory quality
Grace's Warbler	Migratory quality,
Great Curassow	Disturbance + lack of hunting indicator
Great Tinamou	Disturbance + lack of hunting indicator
Hooded warbler	Migratory quality
Keel-billed Motmot	Forest health
Keel-billed Toucan	Forest health/composition and structure
Kentucky Warbler	Migratory quality
Little Tinamou	Forest health, Human animal conflict
Louisiana Waterthrush	Migratory quality
Magnolia warbler	Migratory quality
Northern Waterthrush	Migratory quality
Painted Bunting	Migratory quality
Plain-bellied Chachalaca	Forest composition/structure
Prothonotary Warbler	Migratory quality
Slaty-breasted Tinamou	Disturbance + lack of hunting indicator
Swainson's Warbler	Migratory quality
Wood Thrush	Migratory quality
Worm-eating Warbler	Migratory quality

Bird species totals observed on transects in Q2

Bird Species	BNR2	BNR3	CRFR1	CRFR2	CRFR3	CRFR4	GSCP2	GSCP9	IV1	Grand Total
American Redstart		3		2		4	3			12
Black and White Warbler							1			1
Brown-hooded Parrot				4	2	3				9
Common Yellowthroat		2								2
Crested Guan	1				1					2
Grace's Warbler		9								9
Great Curassow					2					2
Great Tinamou	8			3	3					14
Hooded warbler							1			1
Keel-billed Motmot						5				5
Keel-billed Toucan		2		3	6		3			14
Kentucky Warbler					1					1
Little Tinamou	3			1	1		2		2	9
Magnolia warbler		1				3				4
Northern Waterthrush							1			1
Plain Chachalaca		5	2	6	10		19		16	58
Slaty-breasted Tinamou	14		1	6	4	4				29
Wood Thrush	1						4			5
Yellow-headed parrot		19			8		2			29
Grand Total	27	41	3	25	38	19	36		18	207
Species Richness	5	7	2	7	10	5	9	0	2	

Transect Mammal totals

The mammal species are also monitored according to a list of indicator species which has been selected according to their capacity to help answer questions about the ecological health of the Maya Golden Landscape.

Species	Rationale for monitoring
Agouti	Human animal conflict - pest in farms
Howler Monkey	Forest health/composition and structure
Brown Brocket Deer	
Coati	Human animal conflict - pest in farms
Collared Peccary	Hunting indicator, Human animal conflict - pest in farms
Jaguar	Prey base, Human animal conflict. Not monitor but just record?
Naked-tailed Armadillo	Rare (but not eaten)
Nine-banded Armadillo	Hunting indicator -lowlands
Paca	Forest health, hunting indicator (management effectiveness)
Puma	Prey base, Human animal conflict.
Red Brocket Deer	Hunting (management effectiveness), Human animal conflict
Spider Monkey	Forest health/composition and structure
Tapir	Healthy riverbanks -riparian forests, Human animal conflict
White-lipped Peccary	Connectivity, Forest health/composition and structure
White-tailed Deer	Hunting (management effectiveness), Human animal conflict

In the following tables we provide a basic analysis of raw data drawn from the transect visits made by our ranger team in the first quarter of 2013. The total bird and mammal track sightings are stated, as is species richness for each transect. The final two tables provide the data on environmental conditions and other metadata.

Mammal species totals observed on transects in Q2

Common Name	BNR2	BNR3	CRFR1	CRFR2	CRFR3	CRFR4	GSCP2	GSCP9	IV1	Grand Total
Agouti									2	2
Baird's Tapir			2	1		2	2	1		8
Collared Peccary			2						1	3
Howler Monkey	1	2					2	2		7
Jaguar	1	2	3	2	3					11
Nine-banded Armadillo		1			2	1			2	6
Nothing heard or seen										
Paca				1			1	2		4
Spider Monkey	26									26
Grand Total	28	5	7	4	5	3	5	5	5	67
Species richness	3	3	3	3	2	2	3	3	3	

Transect visits (AM)

Visited transect	Date of visit (M)	Mammal surveyor	Bird surveyor	Start time (M)	Ground conditions (M)	Temperature (M)	Wind conditions (M)	Cloud cover (M)
CRFR3	30/04/2013	Marcus Cholom	Rosendo Coy	5:30	Dry	Medium	Light	Clear
GSCP2	03/04/2013	Vigilio Cal	Marcus Cholom	6:00	Dry	Hot	Light	Clear
BNR2	06/04/2013	Octavio Cal	Pastor Ayalla	6:00	Soft	Medium	Light	Cloudy
BNR3	13/04/2013	Octavio Cal	Anignacio Makin	6:00	Dry	Medium	None	Cloudy
CRFR4	26/04/2013	Octavio Cal	Anignacio Makin	6:00	Dry	Medium	None	Clear
CRFR2	17/05/2013	Zacceus Cal	Marcus Tut	6:00	Dry	Medium	Medium	Cloudy
CRFR1	18/05/2013	Zacceus Cal	Victor Bonilla	5:30	Dry	Medium	None	Clear
GSCP9	28/05/2013	Octavio Cal	Anignacio Makin	6:00	Wet	Medium	None	Cloudy
GSCP9	28/05/2013	Octavio Cal	Anignacio Makin	6:00	Wet	Medium	None	Cloudy
CRFR3	09/05/2013	Octavio Cal	Pastor Ayalla	6:00	Dry	Cold	None	Cloudy
GSCP9	28/05/2013	Octavio Cal	Anignacio Makin	6:00	Wet	Medium	None	Cloudy
IV1	06/06/2013	Rosendo Coy	Rosendo Coy	5:30	Wet	Medium	Light	Cloudy
GSCP2	14/06/2013	Marcus Tut	Victor Bonilla	6:30	Wet	Hot	None	Cloudy
CRFR3	20/06/2013	Octavio Cal	Octavio Cal	6:00	Wet	Medium	None	Cloudy
CRFR4	21/06/2013	Octavio Cal	Anignacio Makin	6:00	Wet	Medium	None	Cloudy
BNR2	05/06/2013	Octavio Cal	Anignacio Makin	6:00	Soft	Medium	None	Cloudy
BNR3	19/06/2013	Vigilio Cal	Marcus Cholom	6:00	Soft	Medium	Medium	Cloudy

Transect visits (PM)

Visited transect	Mammal surveyor	Bird surveyor	Date of visit (E)	Start time (E)	Ground conditions (E)	Temperature (E)	Wind conditions (E)	Cloud cover (E)
CRFR3	Marcus Cholom	Rosendo Coy	29/04/2013	15:00	Dry	Hot	Medium	Clear
GSCP2	Vigilio Cal	Marcus Cholom	02/04/2013	15:00	Dry	Hot	Strong	Clear
BNR2	Octavio Cal	Pastor Ayala	06/04/2013	15:00	Dry	Hot	Light	Cloudy
BNR3	Octavio Cal	Anignacio Makin	12/04/2013	15:00	Dry	Hot	Light	Cloudy
CRFR4	Octavio Cal	Anignacio Makin	25/04/2013	15:00	Dry	Hot	Medium	Cloudy
CRFR2	Zacceus Cal	Marcus Tut	16/05/2013	15:00	Dry	Hot	Medium	Clear
CRFR1	Zacceus Cal	Victor Bonilla	17/05/2013	15:00	Dry	Hot	Light	Clear
GSCP9	Octavio Cal	Anignacio Makin	27/05/2013	15:00	Wet	Medium	Medium	Cloudy
GSCP9	Octavio Cal	Anignacio Makin	27/05/2013	15:00	Wet	Medium	Medium	Cloudy
CRFR3	Octavio Cal	Pastor Ayala	08/05/2013	15:00	Dry	Hot	Medium	Cloudy
GSCP9	Octavio Cal	Anignacio Makin	27/05/2013	15:00	Wet	Medium	Medium	Cloudy
IV1	Rosendo Coy	Rosendo Coy	05/06/2013	15:00	Wet	Hot	Light	Cloudy
GSCP2	Marcus Tut	Victor Bonilla	13/06/2013	15:00	Wet	Hot	Light	Clear
CRFR3	Octavio Cal	Octavio Cal	19/06/2013	15:00	Wet	Medium	Medium	Cloudy
CRFR4	Octavio Cal	Anignacio Makin	20/06/2013	15:00	Wet	Medium	None	Cloudy
BNR2	Octavio Cal	Anignacio Makin	05/06/2013	15:00	Soft	Medium	Medium	Cloudy
BNR3	Vigilio Cal	Marcus Cholom	19/06/2013	15:00	Soft	Medium	Medium	Cloudy