

English



CITES MODULE

| Technical report |

Build capacity for the Management of the Domestic Wildlife Trade in Guyana





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| Technical report |

Build capacity for the Management of the Domestic Wildlife Trade in Guyana

Consultancy to build capacity for the Management of the Domestic
Wildlife Trade in Guyana
Gavin Agard

Build capacity for the Management of the Domestic Wildlife Trade in Guyana

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Acronyms

CITES	Convention on International Trade in Endangered Species of Wild Fauna and Flora
GFC	Guyana Forestry Commission
GLSC	Guyana Lands and Surveys Commission
GWCMC	Guyana Wildlife Conservation and Management Commission
IUCN	International Union for the Conservation of Nature
PAT	Protected Areas Trust (Guyana)

Presentation

The Amazon Cooperation Treaty Organization (ACTO) is pleased to present the results of consultancies and technical studies carried out within the scope of its Regional Project for the Management, Monitoring and Control of Species of Wild Fauna and Flora Threatened by Trade (Bioamazon Project), in the format of the publications of the Amazon Regional Observatory (ARO).

In this way, we support the recording and dissemination of knowledge produced during the implementation of the Bioamazon Project by placing the studies available in the CITES Module of the Observatory. These consultancies and studies would not have been possible without the invaluable collaboration of partner institutions in ACTO Member Countries, as well as the organization's donor KfW (German Development Bank) who provided the funding.

In this Technical Report ***“Build capacity for the Management of the Domestic***

Wildlife Trade in Guyana”, developed for the Guyana Wildlife Conservation and Management Commission (GWCMC), one will find out about the efforts to build awareness on the importance of regulating the wildlife trade; to develop a national system of harvest zones and harvest quotas for specific species, and to establish checkpoints for the monitoring and enforcement of the domestic wildlife license system.

We thank the German International Cooperation and the German Development Bank (KfW) for supporting ACTO over the years with the Bioamazon Project and the Amazon Regional Observatory.

Finally, we hope the contribution of this Technical Report to the knowledge management will inspire other institutions and countries to improve their practices in implementing CITES Convention on the Amazon Region.

María Alexandra Moreira López
General Secretary
Amazon Cooperation Treaty
Organization - ACTO

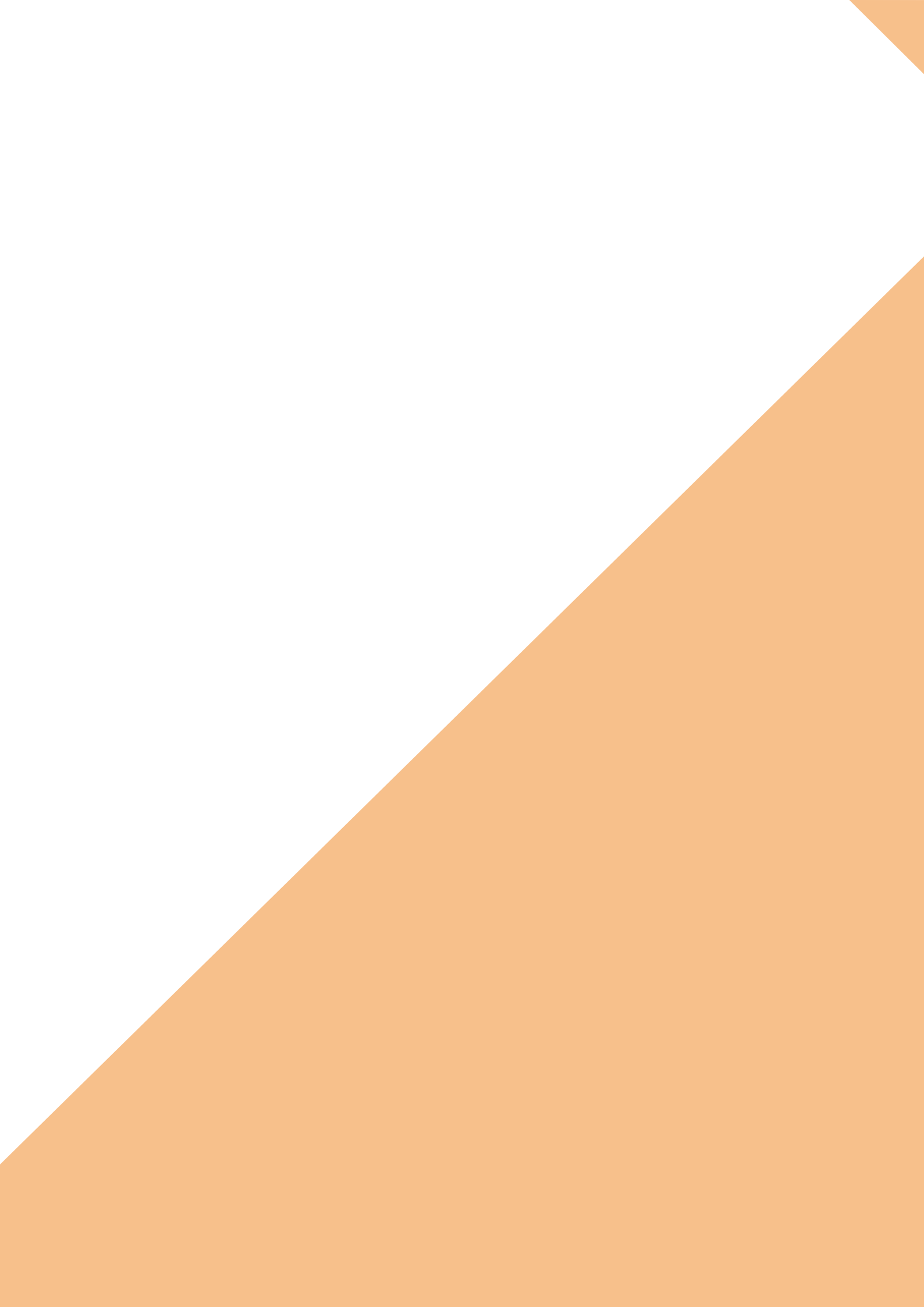


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Introduction



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Introduction

In Guyana, the enactment of the Wildlife Conservation and Management Act of 2016 brought virtually all aspects of the management of wildlife species under a singular legislation. The legislative framework provides for licences to be issued to operators in the trade from trappers and hunters to local retailers and international exporters.

In an endeavor to build capacity for the management of the Domestic Wildlife Trade in Guyana efforts were directed towards three (3) components:

1. building awareness about the importance of regulating the wildlife

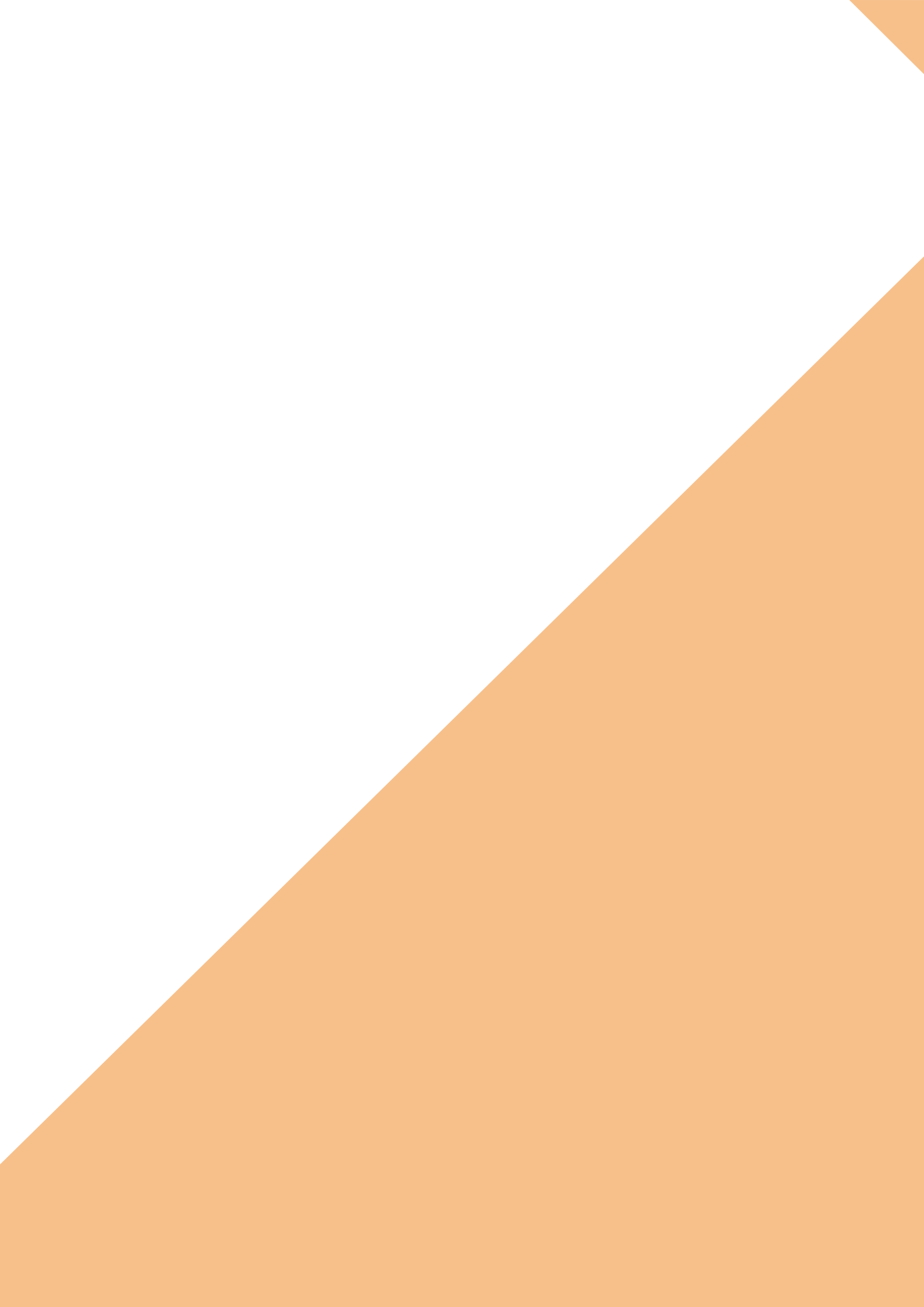
trade among wildlife stakeholders through an extensive stakeholder engagement campaign.

2. development of a national system of harvest zones and harvest quotas for specific species identified by the Guyana Wildlife Conservation and Management Commission (GWCMC).
3. the establishment of checkpoints for the monitoring and enforcement of the domestic wildlife licence system.

2. Stakeholder Engagement



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2. Stakeholder Engagement

The technical approach and applied methods varied depending on the desired objective and the stakeholder group. Several focus group meetings and regional consultations were facilitated by the GWCMC with the support of an independent consultant, to obtain information and raise awareness of the implementation of the domestic wildlife licences. The stakeholder analysis guided the selection of participants and geographic locations for regional consultations. Deliberate effort was made to ensure a stratified sample of wildlife stakeholders were adequately engaged and made aware of the implementation of the domestic wildlife licence in Guyana.

2.1 Regional Consultations

The regional consultations were conducted over a four-month period (April to July, 2021) in strategic communities situated in eight administrative regions. The regions are as follows: Region 1 (Mabaruma and Santa Rosa), Region 2 (Lake Mainstay and Charity), Region 4 (East Bank Demerara / Soesdyke, Georgetown), Region 6 (Corentyne), Region 7 (Bartica, Kamarang), Region 8 (Mahdia), Region 9 (Annai, Karasabai and Lethem), and Region 10 (Linden).

2.2 Focus Group Meetings

Focus group meetings with a wide cross section of institutions were facilitated via Zoom or in person based on the size of the group, geographic location or preference of the group.

2.3 Domestic Wildlife Brochure

In Guyana, stakeholders always appreciate tangible awareness material to take away from stakeholder engagement sessions. The PDF version of the brochure was also shared via WhatsApp to wildlife stakeholders at focus group and regional consultation sessions. WhatsApp was recommended by stakeholders as a communication method that allows for easy sharing of information among wildlife stakeholders.

2.4 Public Awareness Campaign

A public awareness campaign for the domestic wildlife licence was launched to raise awareness through a series of radio interviews and informative videos that address the implementation of the domestic licences from the perspectives of stakeholders of different backgrounds

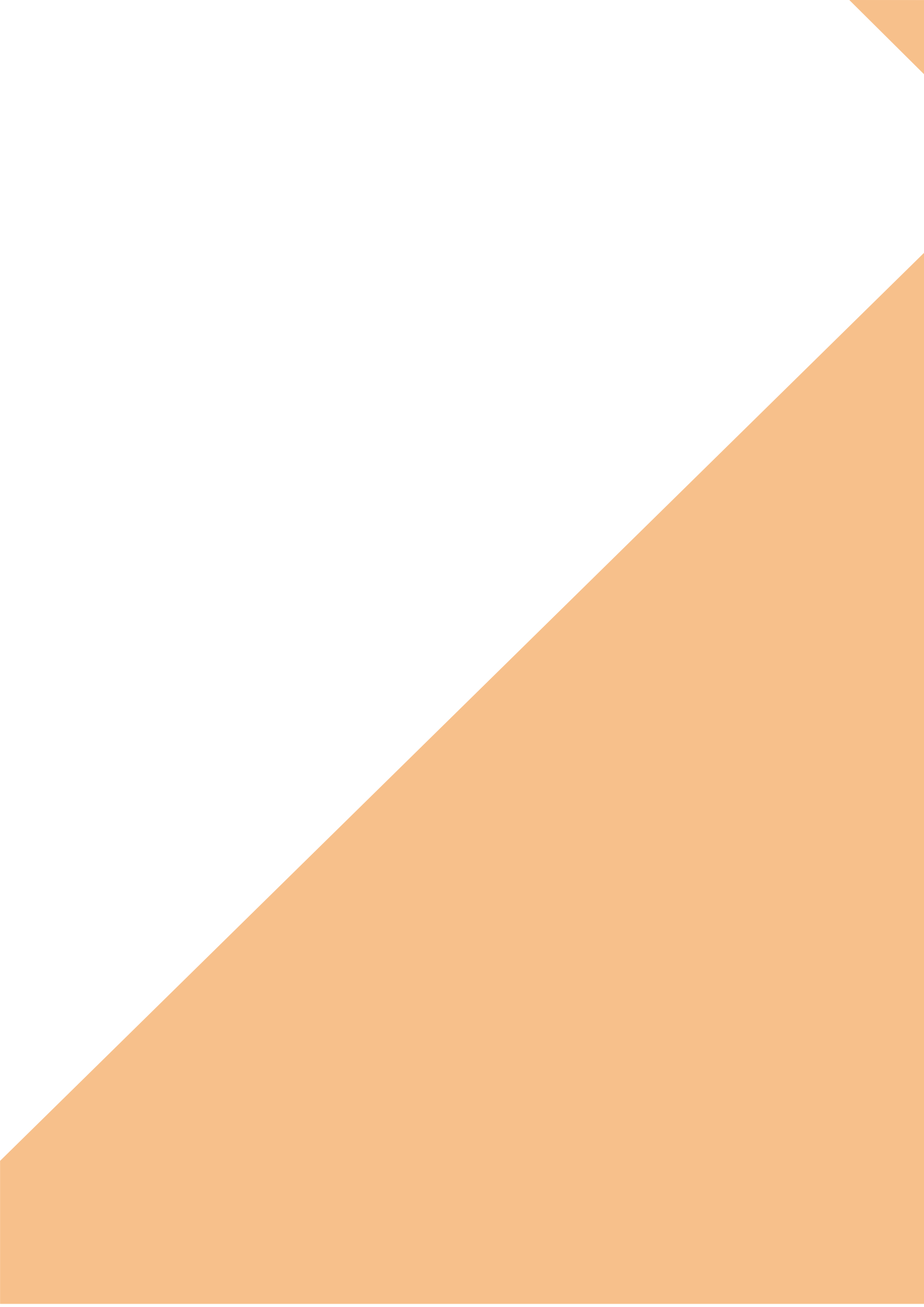
such as tourism, regulatory, indigenous representatives, international organizations and hunters and trappers.

A total of seven radio interviews were conducted to discuss the Domestic Wildlife Licensing System. Eight videos were also successfully produced and published. The concept for the ninth video differed slightly from the others and is to be completed following arrangements with the GWCMC. Seven of the remaining videos were published on the Guyana Wildlife Conservation and Management Commission's Facebook Page.

3. Results of the Stakeholder Engagements



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3. Results of the Stakeholder Engagements

3.1. Reports for Regional Consultations and Focus Group Meetings

The reports for the regional consultations and the focus group meetings captured the assessment of awareness about the importance of regulating the wildlife trade among wildlife stakeholders. These activities provided wildlife

stakeholders with a unique opportunity to express their opinions, fears, concerns, excitement and recommendations regarding the implementation of the domestic wildlife licence system.

FIGURE 1.
Cover pages for the Regional Consultation Report and Focus Group Meeting Report

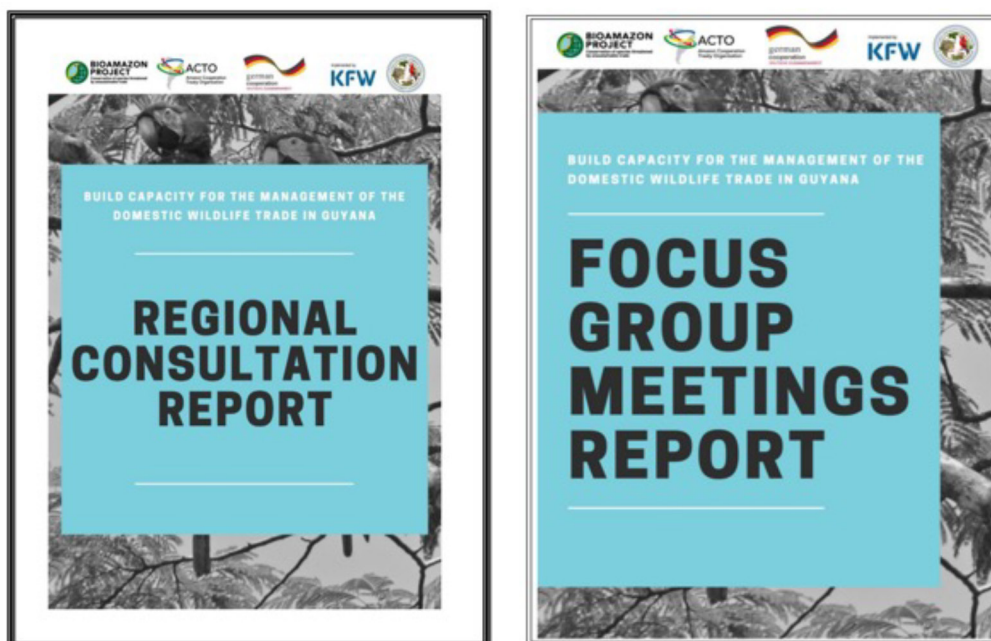


Figure Source: Gavin Agard

The key issues raised at the regional consultations about the implementation of domestic licences were: impact on indigenous peoples, communication

strategies, checkpoints and harvest zones, compliance monitoring, wildlife education, health and license fees.

FIGURE 2.
Key themes raised by stakeholders

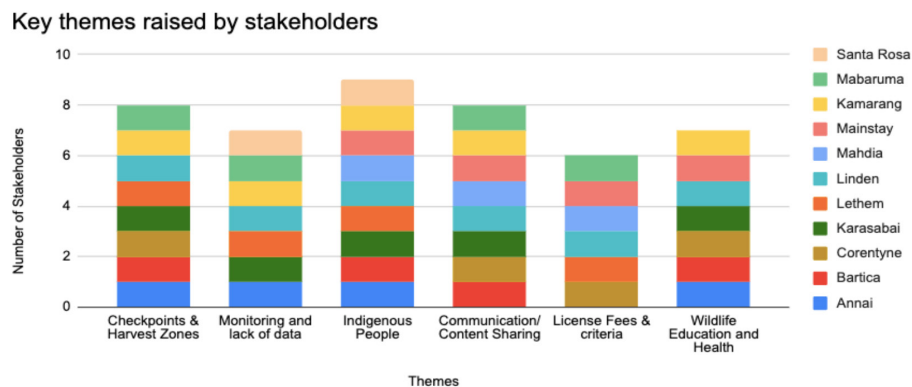


Figure Source: Gavin Agard

Participants expressed that the establishment of checkpoints, monitoring and enforcement as well as community engagement are some of the key challenges. It was recorded that some benefits of the domestic license system include legitimizing the wildlife trade, improved data for decision making and enhanced population management.

The keys issues raised during the focus group meetings surrounded the eight (8) thematic areas including: institutional ambiguities, capacity building/ awareness raising/ collaboration, harvest zones/ checkpoints/ quotas/ permits, fisheries and illegal trade, village related concerns, royalties/ license fees, wildlife-human conflict and incentives.

FIGURE 3.
Key Issues raised in Focus Group Meetings

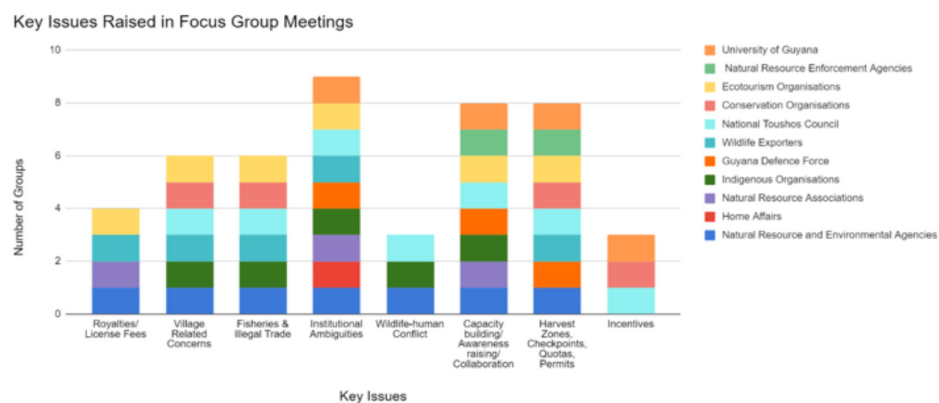


Figure Source: Gavin Agard

The main challenges highlighted during the meetings were monitoring and enforcement, inadequate research, language/terminology, corruption, cultural appropriateness and interagency coordination. Although the challenges seem insurmountable, participants expressed that the benefits associated with implementing domestic wildlife licenses supersede the array of highlighted challenges. In many instances, the participants specified

mitigating measures to remedy the highlighted challenges.

3.2 Domestic Wildlife Brochure

In an effort to raise awareness of the licence types, fees and application requirements a brochure containing the relevant information related to the domestic licence system was printed and distributed at stakeholder engagements.

FIGURE 4.
Image of Domestic Wildlife Brochure



The brochure is titled "LICENSING OF THE DOMESTIC WILDLIFE TRADE" and "Securing the future of our wildlife". It features images of various wildlife species including a purple orchid, a toucan, a deer, and a parrot. The brochure is divided into several sections:

- What are the requirements for obtaining a license?**
 - A filled Application Form
 - National Identification Card or Passport (back and front)
 - Two (2) recent Passport size photos
 - TIN Certificate
 - Firearm License for Recreational Hunters only
 - Show proof of having adequate housing for trapped wildlife (for trappers and middlemen)
 - Food Handling Certificate (Restaurants, cook-shops, rum-shops/bars)
 - Pay an Application Processing Fee
- What is it?**

Guyana's wildlife is an important natural resource. If not managed effectively, we could lose the opportunity to benefit from this resource in the future.

Licensing is an effective tool in the proper management of our wildlife. It provides a way for us to control how, when, where and which wildlife is exploited. It also helps us to determine who exploits our wildlife. As such, the GRCMC is introducing a suite of licenses to improve the management of Guyana's wildlife.

Why is it important?

Many Guyanese depend on wildlife to maintain their livelihood or to supplement their income. These licenses help to ensure that these persons and their descendants can continue to support their livelihood as well as supplement their diet for many generations to come.

Who needs to be licensed?

The following persons would need to obtain licenses: Trappers, Middlemen, Wildmeat Vendors, Wildlife Breeders, Wildlife Collectors (of both plants and animals), Researchers, Recreational Hunters, restaurants that sell cooked wild meat.

Indigenous Village Councils may also apply for a license to cover wildlife users who are registered members of the village.
- License Types and Fees Table:**

License Type	Class	Class Application	Validity	Cost \$
WILDLIFE TRAPPING	Class I	A person who harvests for subsistence use and is not a recreational hunter	1 year	\$10,000
	Class II	A person who harvests for sale	1 year	\$10,000
	Class III	A legally recognized Indigenous village council	1 year	\$50,000
WILDLIFE COLLECTING	Class I	Middlemen	1 year	\$30,000
	Class II	Collectors of wild plants not used for structural purposes	1 year	\$10,000
	Class III	Pet shops	1 year	\$10,000
WILDLIFE COMMERCIAL	Class IIA	Large Scale vendors	1 year	\$50,000
	Class IIB	Medium scale	1 year	\$30,000
	Class IIC	Small Scale	1 year	\$20,000
	Class IIA	Restaurants which sell wild meat	1 year	\$20,000
	Class IIB	Establishments which sell wild meat	1 year	\$40,000
	Class IIC	Large Scale vendors	1 year	\$40,000
	Class IIB	Medium scale	1 year	\$30,000
	Class IIC	Small Scale	1 year	\$20,000
WILDLIFE RECREATIONAL	Class I	Individual	1 year	\$20,000
	Class II	Group	1 year	\$20,000
	Class III	Individual	3 days or weekend	\$5,000
	Class IV	Individual, Non-resident	1 day	\$5,000
WILDLIFE CAPTIVE	Class I	Individuals or institutions who hold more than 8 specimens for captive breeding, research or pleasure	1 year	\$30,000
	Class II	Individuals or institutions who hold more than 8 specimens for captive breeding, research or pleasure	1 year	\$50,000
SPECIAL WILDLIFE	Class I A	Student	To be determined by the Commission	\$5,000
	Class II	Academic Institution	To be determined by the Commission	\$100,000
	Class III	Commercial Institution	To be determined by the Commission	\$100,000
	Class IV	National Collection	To be determined by the Commission	\$10,000
	Class V	Private collections held for profit	To be determined by the Commission	\$20,000

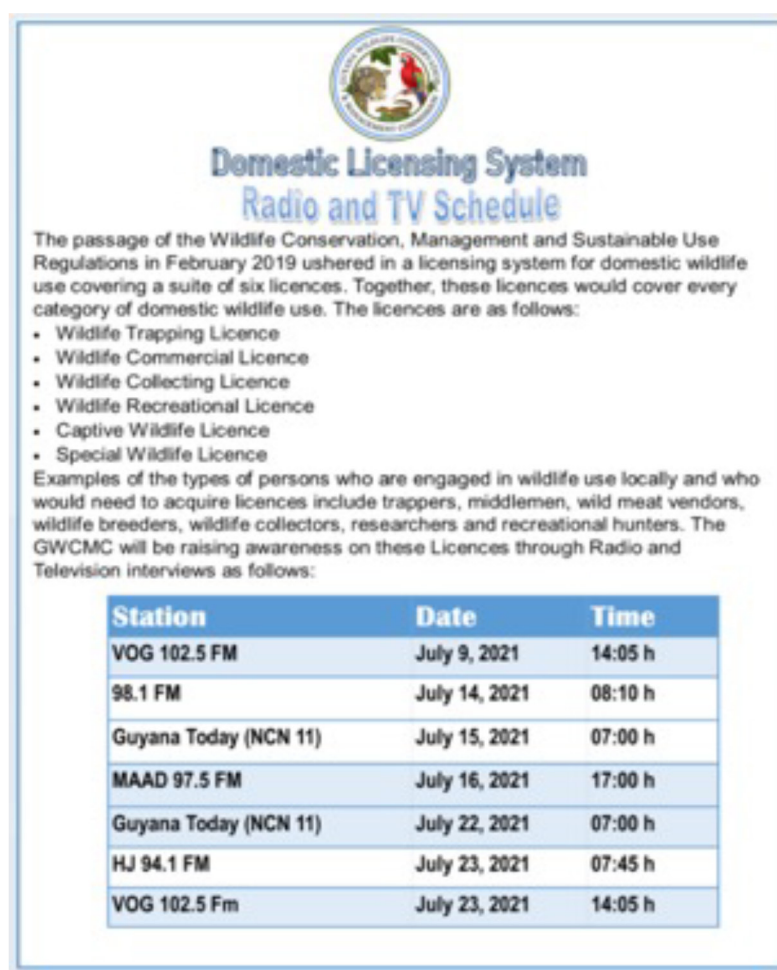
Figure Source: Gavin Agard

3.3 Radio and Television

Radio interviews were scheduled to discuss the pertinent details of the Domestic Licensing System relevant to members of the public. Given the limited availability of analytics on radio stations and the inability to effectively measure Return on Investment, interviews were booked on stations that at least covered the main geographical areas: Berbice, Demerara, Linden and Essequibo.

Major stations with the largest estimated audience like HJ.94.1FM, 98.1FM AND VOG 102.5FM were also selected to ensure maximum coverage. Some of these stations also paired their broadcasts with Live Facebook streaming which also increased reach. Radio scripts were prepared and are available to be recorded and shared with radio stations in the hinterland.

FIGURE 5.
Radio and Television Schedule



The poster features the Guyana Wildlife Conservation Commission logo at the top. Below it, the title 'Domestic Licensing System Radio and TV Schedule' is displayed. The text explains that the Wildlife Conservation, Management and Sustainable Use Regulations in February 2019 introduced a licensing system for domestic wildlife use, covering six categories of licences. These are listed as: Wildlife Trapping Licence, Wildlife Commercial Licence, Wildlife Collecting Licence, Wildlife Recreational Licence, Captive Wildlife Licence, and Special Wildlife Licence. Examples of persons engaged in wildlife use locally are provided, including trappers, middlemen, wild meat vendors, wildlife breeders, collectors, researchers, and recreational hunters. The poster states that the GWCMC will raise awareness through radio and television interviews, which are detailed in the table below.

Station	Date	Time
VOG 102.5 FM	July 9, 2021	14:05 h
98.1 FM	July 14, 2021	08:10 h
Guyana Today (NCN 11)	July 15, 2021	07:00 h
MAAD 97.5 FM	July 16, 2021	17:00 h
Guyana Today (NCN 11)	July 22, 2021	07:00 h
HJ 94.1 FM	July 23, 2021	07:45 h
VOG 102.5 Fm	July 23, 2021	14:05 h

Figure Source: Gavin Agard

3.4. Social Media

The published videos were uploaded on September 7, 2021 to the GWCMC's Facebook Page which has and garnered a total of 3,600 followers. These numbers represent the number of persons who viewed the video for longer than three

seconds of its duration without paid distribution. Paid distribution should be considered to increase both the fan base and the reach of the content being posted.

TABLE 1.
List of videos prepared

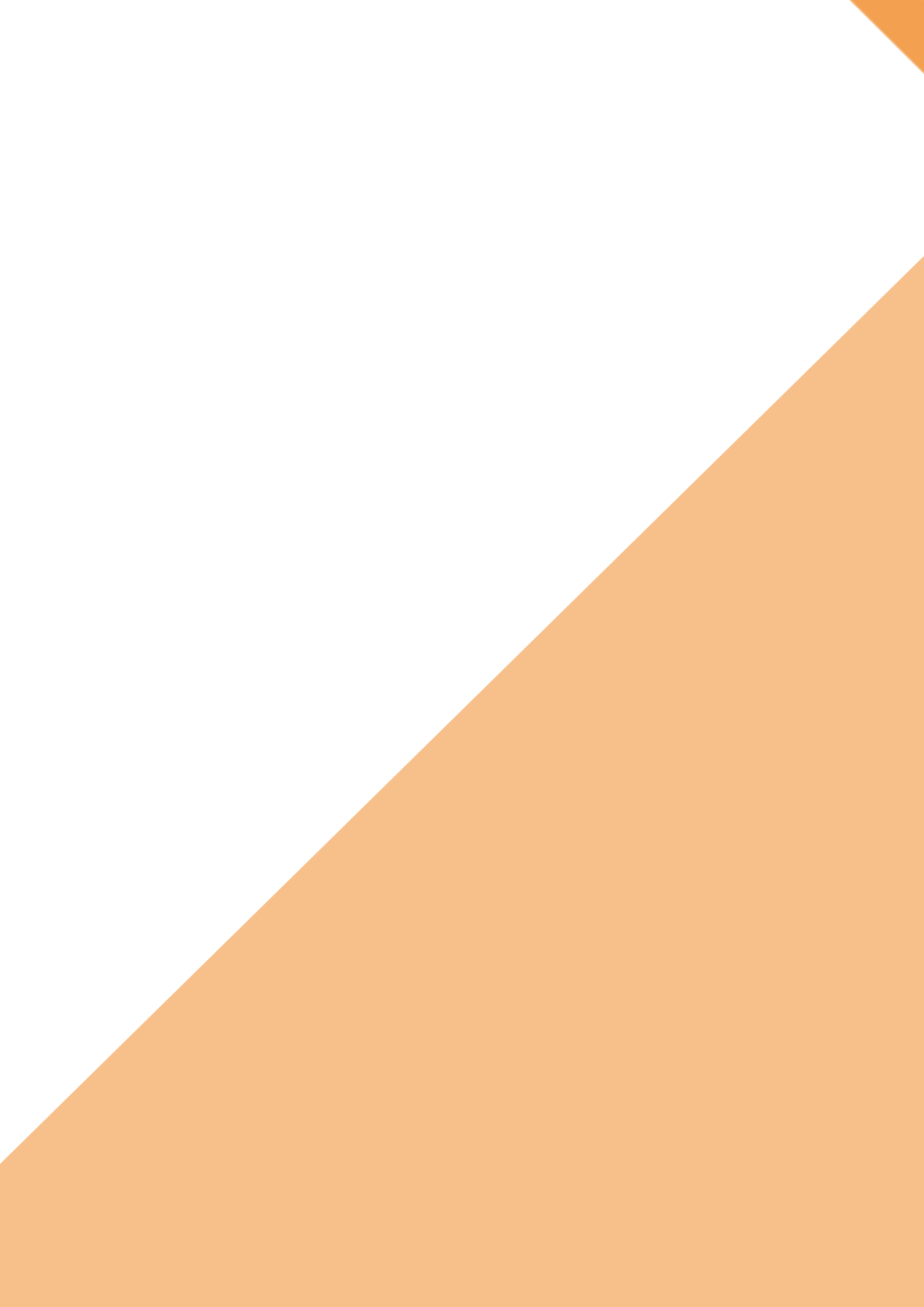
No	Organization	Organization's representative	Designation	Link
1	Amerindian People Association	Jean La Rose	Executive Director	https://od.lk/d/MjVfMjQ0ODQ3MTNf/APA.m4v
2	Conservation International	Curtis Bernard	Executive Director	https://od.lk/d/MjVfMjQ0ODQ4MThf/Conservation%20International%20.m4v
3	Guyana Livestock Development Authority	Dr. Paimnauth Tihul	Senior Veterinary Officer	https://od.lk/d/MjVfMjQ0ODUxNzBf/LIVESTOCK.m4v
4	Guyana Tourism Authority	Kamrul Baksh	Representative	https://od.lk/d/MjVfMjQ0ODU0Nzhf/Tourism%20authority.m4v
5	Guyana Wildlife Conservation and Management Commission	Lemuel Cromwell	Director, Monitoring and Compliance	https://od.lk/d/MjVfMjQ0ODQ5Mzlf/GWCMC.m4v
6	Iwokrama Centre for Rainforest Development	Dr. Raquel Thomas	Director, Resource Management and Training	https://od.lk/d/MjVfMjQ0ODU2NThf/Wokrama.m4v
7	Tourism and Hospitality Association of Guyana	Harrinand Persaud		https://od.lk/d/MjVfMjQ0ODUzMTNf/TOURISM%20AND%20HOSPITALITY.m4v
8	Environmental Protection Agency	Rayner McAndrew	Environmental Officer II	https://od.lk/d/MjVfMjQ0ODQ4ODNf/EPA.m4v
9	Hunting and Trapping perspective	Flemming Brothers	Hunter and Trapper	

Table Source: Gavin Agard

4 Development of a national system of harvest zones and harvest quotas



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4. Development of a national system of harvest zones and harvest quotas

With the enactment of the Wildlife Conservation and Management Act of 2016 Guyana's national CITES legislation became CITES Category 1 compliant. This brought virtually all aspects of the management of wildlife species under a singular legislation. It especially brought all aspects of the trade in wildlife species under this new law. The Guyana Wildlife Conservation and Management Commission, which was established under the act, has since had the responsibility for implementing the provisions of the act. The legislative framework provides for licences to be issued to operators in the trade from trappers and hunters to local retailers and international exporters.

To achieve the goal of sustainable management of all species through an effective licensing system, the GWCMC has decided that a national system of harvest zones will be established and that harvest quotas will be determined for each zone which together will constitute a national quota.

4.1 Technical Approach and Applied Methods

Changes in local law in Guyana brought the country's legislation into compliance with CITES category 1 and provided for the Guyana Wildlife Conservation and

Management Commission to assume responsibility for all aspects of the harvest and trade in wildlife. Consequently, the GWCMC has sought to determine a methodology for the establishment of harvest quotas within specified harvest zones, and to use that methodology to establish quotas for 25 selected species.

The method developed was based on the concept of maximum sustainable yield, the precautionary principle and CITES concept of non-detriment and utilized available data on the species. Quotas above zero could only be determined for 21 species. A lack of data and conservation concern related to the other 3 species resulted in a zero quota. Data availability was the major limitation. Careful monitoring of the implementation of these quotas is recommended.

The approach to the determination of quotas utilized the concept of maximum sustainable yield (MSY) (WEINBAUM et al., 2012) which is the absence of detailed longitudinal ecological data was implemented as sustainable yield. This required information for the computation of an estimated net annual population growth was only possible for some species. In other cases, categorical data on abundance, current or previous quotas for the species from Guyana or neighboring Suriname, local utilization and conservation status were taken

into account to determine a quota. Considering the limited data available, the precautionary principle (KRIEBEL et al., 2001) was applied in all cases in keeping with the CITES concept of non-detriment (ROSSER & HAYWOOD, 2002).

Harvest zones and national quotas for each species was determined based on data available on the species and suitable habitats at the national and harvest zone levels. Literature searches were conducted for data on each species using online sources and at the Guyana Wildlife Conservation and Management Commission. Data gathered from literature was inputted into a spreadsheet under the headings described below.

- Local names - Names by which the animal is known locally as far as possible.
- Population - Population size or density assessment and trends for the species in specific places in Guyana (Local) or anywhere in its natural range (Global/Regional). As many references as found.
- Biology - A description of the general reproductive biology of the species including data on reproductive strategy and rates. Any data that could be used to determine

reproductive rate was also included, including, population sex ratio, age structure, age at first reproduction, number of offspring produced per reproductive season. This also included lifespan (overall and reproductive) and ecological niche occupied by the species.

- Biogeography - Data on the habitat and ecosystems occupied by the species. Including species distribution globally, at least to the level of biogeographical zones or significant biogeographical regions such as the Guiana Shield of Amazon Region, and nationally, with greatest accuracy.
- Conservation status - Any listing of the species on the Appendices of the Convention on International Trade in Endangered Wild Species of Fauna and Flora (CITES), the Red List of the International Union for the Conservation of Nature (IUCN) and in local law. Data on known threats and pressures faced by the species.
- Harvest and management - Data on the local harvest of the species if available as well as data on existing or past export quota and actual trade in the species for Guyana or Suriname. Description on local management measures in place for the species.

4.2 Results of the national system of harvest zones and harvest quotas

The report titled “Determination of National harvest Quotas for Selected Species” was the main deliverable. The report details the methodology used to develop quotas for twenty-five (25) species – 12 mammals, 12 birds and 1 reptile. The list of species (scientific and English names) was provided by the Guyana Wildlife Conservation and Management Commission.

It was predetermined that for the purpose of managing extraction of species to distribute the pressure across their ranges harvest zones would be established by the GWCMC. The harvest zones are currently equivalent to the Administrative Regions of Guyana.

FIGURE 6.
Cover page for National Harvest Quota publication

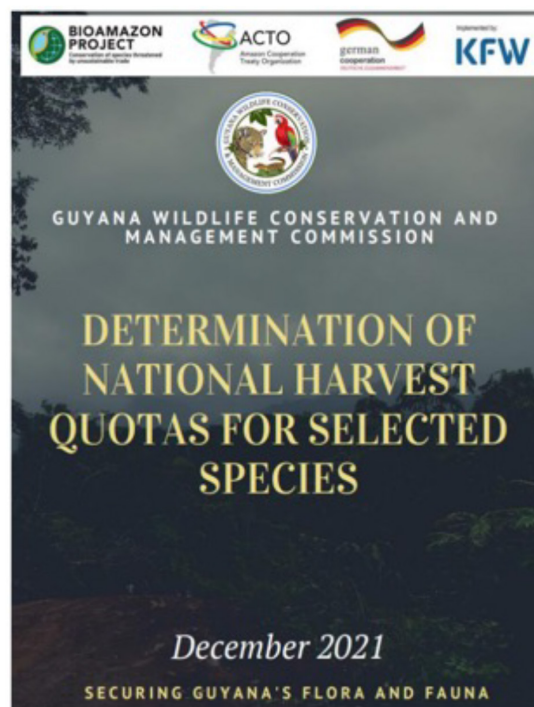


Figure Source: Gavin Agard

The report is laid out in three main sections.

- First a detailed methodology which describes the process of developing the quotas and the rationale.
- The second section provides the proposed national level quota for each species together with the specific reasoning applied for the species.
- And the third section provides a breakdown of the national quota to the level of harvest zone.

TABLE 2.
Summary of the National Quota for selected species

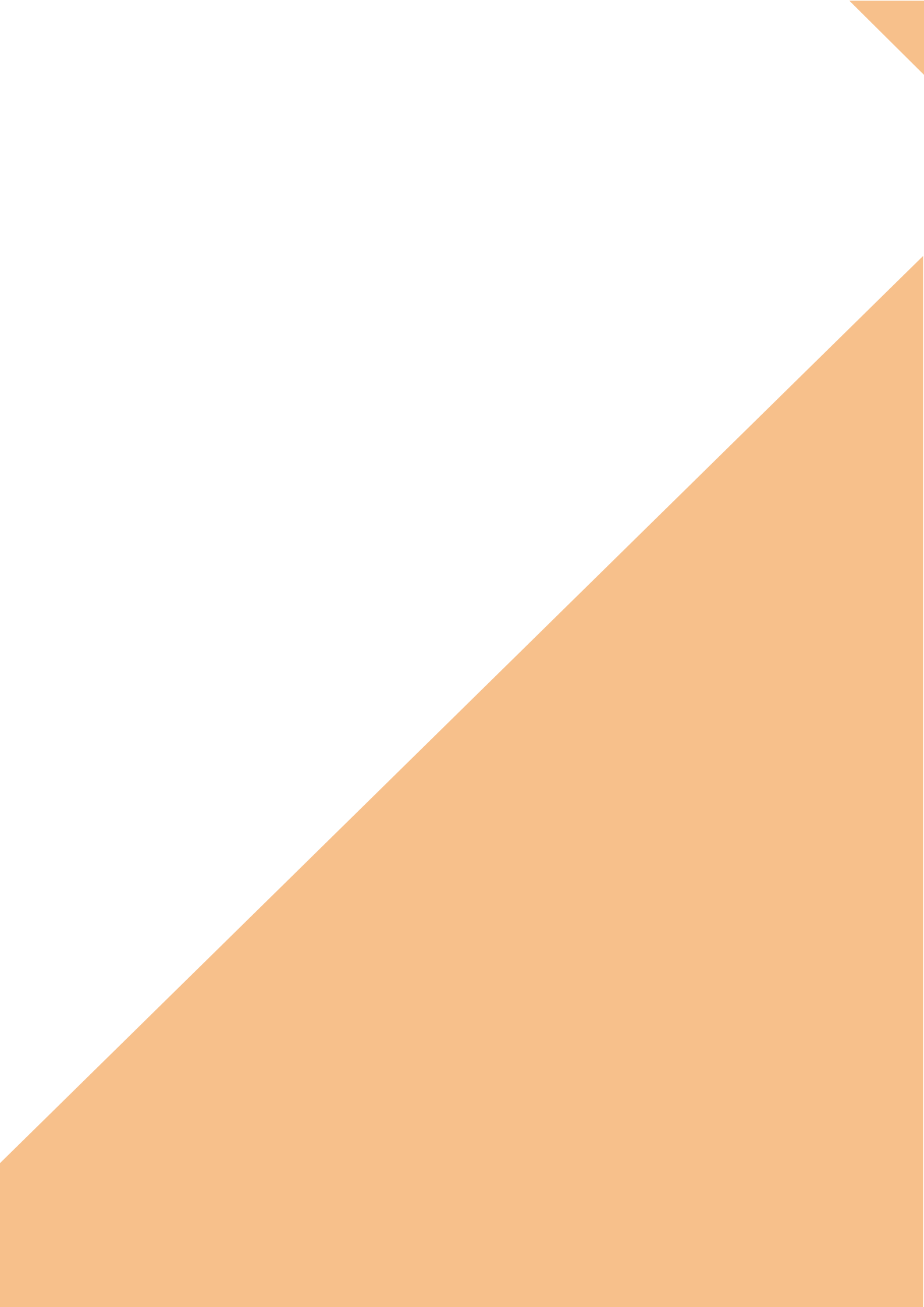
No	Scientific Name	English Name	Recommended Quota
1	<i>Cuniculus paca</i>	Labba / pacca or Lowland paca	37,631
2	<i>Dasyprocta leporina</i>	Agouti	37,631
3	<i>Mazama americana</i>	Deer - red brocket	1,582
4	<i>Odocoileus virginianus</i>	Deer - white tail	746
5	<i>Mazama gouazoubira</i>	Deer - grey brocket deer/brown brocket	2,690
6	<i>Tayassu pecari</i>	Peccary - white lipped	1,649
7	<i>Pecari tajacu</i>	Peccary - collared	3,054
8	<i>Hydrochoerus hydrochaeris</i>	Capybara	6,436
9	<i>Priodontes maximus</i>	Armadillo - giant	0
10	<i>Dasypus novemcinctus</i>	Armadillo - nine-banded	150
11	<i>Cabassous unicinctus</i>	Southern naked tail Armadillo	0
12	<i>Dasypus kappleri</i>	Greater Long nosed Armadillo	75
13	<i>Crax alector</i>	Powis	156
14	<i>Tinamus major</i>	Great Tinamou/ Maam	50
15	<i>Actitis macularius</i>	Sandpiper	250
16	<i>Cairina moschata</i>	Ducks- Muscovy	100
17	<i>Dendrocygna autumnalis</i>	Duck - Black-bellied Whistling-Duck	1,000
18	<i>Anas discors</i>	Blue winged teal duck	0
19	<i>Dendrocygna viduata</i>	White faced whistling duck	1,500
20	<i>Anas carolinensis</i>	Green winged teal duck	0
21	<i>Anas bahamensis</i>	The bahama white jawed pintail	50
22	<i>Psophia crepitans</i>	Grey-winged trumpeter	200
23	<i>Penelope marail</i>	Marudi - Marail guan	125
24	<i>Penelope jacquacu</i>	Marudi - Spix's guan	250
25	<i>Iguana iguana</i>	Iguana	246,204

Table Source: Gavin Agard

5. Establishment of checkpoints for the monitoring and enforcement of the domestic wildlife licence system



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5. Establishment of checkpoints for the monitoring and enforcement of the domestic wildlife licence system

The harvesting and trade of wildlife occurs in all regions of Guyana. Therefore, the establishment of checkpoints are essential for the monitoring and enforcement of the domestic wildlife licence system. The workplan of this project identifies three (3) activities that must occur to ensure the successful operation of checkpoints.

These activities include:

1. Identify and geographically depict the major transit routes for wildlife.
2. Develop an operational framework for the establishment of checkpoints including but not limited to Memorandums of Understanding (MoU) with agencies where the check points will be established.
3. Develop guidelines for operations at the select checkpoints sites.

This report highlights the achievement of activities detailed in the workplan in relation to the licensing of wildlife users.

5.1 Technical Approach and Methods Applied

The technical approach and method applied varied based on the activity and the desired product.

Activity	Technical Approach
1	Literature Review Institutional Harvest Records
2	Focus Group meetings
3	Interviews
Activity	Method Applied
1	Geographic Information Systems
2	Microsoft Word

5.2. Results

This section provides a summary of the activities specified in the workplan. Detail reports and products related to each activity is captured in the annexes.

5.2.1 Activity #1: Identify and geographically depict the major transit routes for wildlife

An integral component of this activity was to build the capacity of key staff within the GWCMC to perform geospatial tasks. A baseline assessment revealed that, prior to this project, the staff of the GWCMC did not utilize Geographic Information Systems (GIS) to perform routine task within the Commission.

The four (4) GWCMC staff who participated in the introductory GIS course organized by the Guyana Lands and Surveys Commission (GLSC) are:

N	Name of GWCMC Staff	Designation
1	Charles Stephen	Research Officer
2	Johann Waldron	Research Officer
3	Steven Jones	Monitoring Officer
4	Troy Crawford	Monitoring Officer

The course commenced on February 15, 2021, for a duration of three (3) weeks from Mondays to Thursdays at 10:00 - 12:00hrs.

The course aimed to impart basic GIS functions and operations through lectures, presentations and hands-on training. In this regard, participants work with suitable software, a training manual and various datasets.

After completing the course, the GWCMC staff are able to:

1. Understand concept and principles of GIS
2. Create, develop and update geographic data sets

3. Store, manipulate and present data and information
4. Process data for informed decision making and solving problems

This capacity building activity laid the foundation for the geospatial tasks that will arise after the implementation of the domestic wildlife licence system. Some of these tasks include:

- Recording and geographically displaying the location of licence holders
- Geographically representing the transportation permit data
- Displaying wildlife movement along extraction routes

FIGURE 7.
GWCMC staff with their certificates



Figure Source: Gavin Agard



The hinterland region of Guyana is connected with limited arterial roads. The major transit routes for wildlife follows the main arterial road, major rivers and air transportation to the main domestic airport in Georgetown (Eugene F. Correia International Airport) which providing commercial passenger and

cargo air transport services, primarily between Georgetown and the hinterland of Guyana.

An analysis of the transit routes was conducted and the below map was generated.

FIGURE 8.
Map of Guyana depicting the proposed checkpoints and transit routes

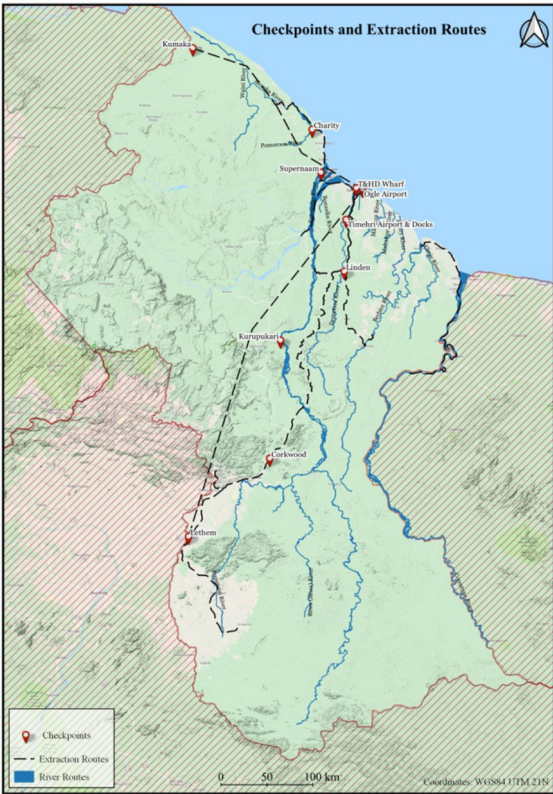


Figure Source: Gavin Agard

5.2.2 Activity # 2: Develop Memorandums of Understanding (MoU) with agencies

The signing of Memorandum of Understanding (MOU) between countries or institutions as a means of demonstrating commitment to a common cause and

defining roles and responsibilities for a specific collaboration is a commendable practice.

The Guyana Wildlife Conservation and Management Commission has commenced discussions with several organizations, including the Guyana Forestry Commission (GFC)¹, Guyana Livestock Development Authority (GLDA)² and Iwokrama International Center for Research Development³, to approve and sign the Memorandum of Understanding.

The Memorandum of Understanding template was developed and approved by the Board of Directors of the GWCMC. One institution (Iwokrama) has approved

and signed the MOU while the other two organizations (GFC and GLDA) have agreed in principle with the content of the MOU but is awaiting approval from their respective Board of Directors or Subject Minister prior to signing the Memorandum of Understanding.

Iwokrama International Center for Research Development signed the MOU on the 6th August, 2021. The press release regarding the signing of the MOU can be viewed: Iwokrama celebrates 25 years - Stabroek News.

FIGURE 9.
Representatives from GWCMC and Iwokrama displaying the signed MOU



Figure Source: Gavin Agard

As part of the public awareness campaign for the domestic wildlife licence videos were developed where an array of stakeholders including the Guyana Livestock Development Authority (GLDA) and the Iwokrama International Center for Research Development.

5.2.3 Activity # 3: Operations at checkpoints sites

The Operational Guidelines is designed to guide staff of the GWCMC or officers from other institutions that have signed the Memorandum of Understanding with the GWCMC and will be performing duties on behalf of the GWCMC.

¹ Guyana Forestry Commission – Ensuring Sustainable Forestry

² GLDA - Home

³ Iwokrama International Centre – Iwokrama! The Green Heart of Guyana.

It is imperative for any officer performing the duties of the GWCMC to conduct their daily routine tasks while remaining within the guidelines and objectives of the GWCMC. The operational guidelines will serve as a critical driver of knowledge exchange between employees in different departments or at different levels.

The operational guidelines should be viewed as a fluid document that may require updates and feedback from the employee on the job. Their feedback on key tasks or changing elements within their roles is critical information for the organization to analyze, learn from, and be adjusted accordingly.

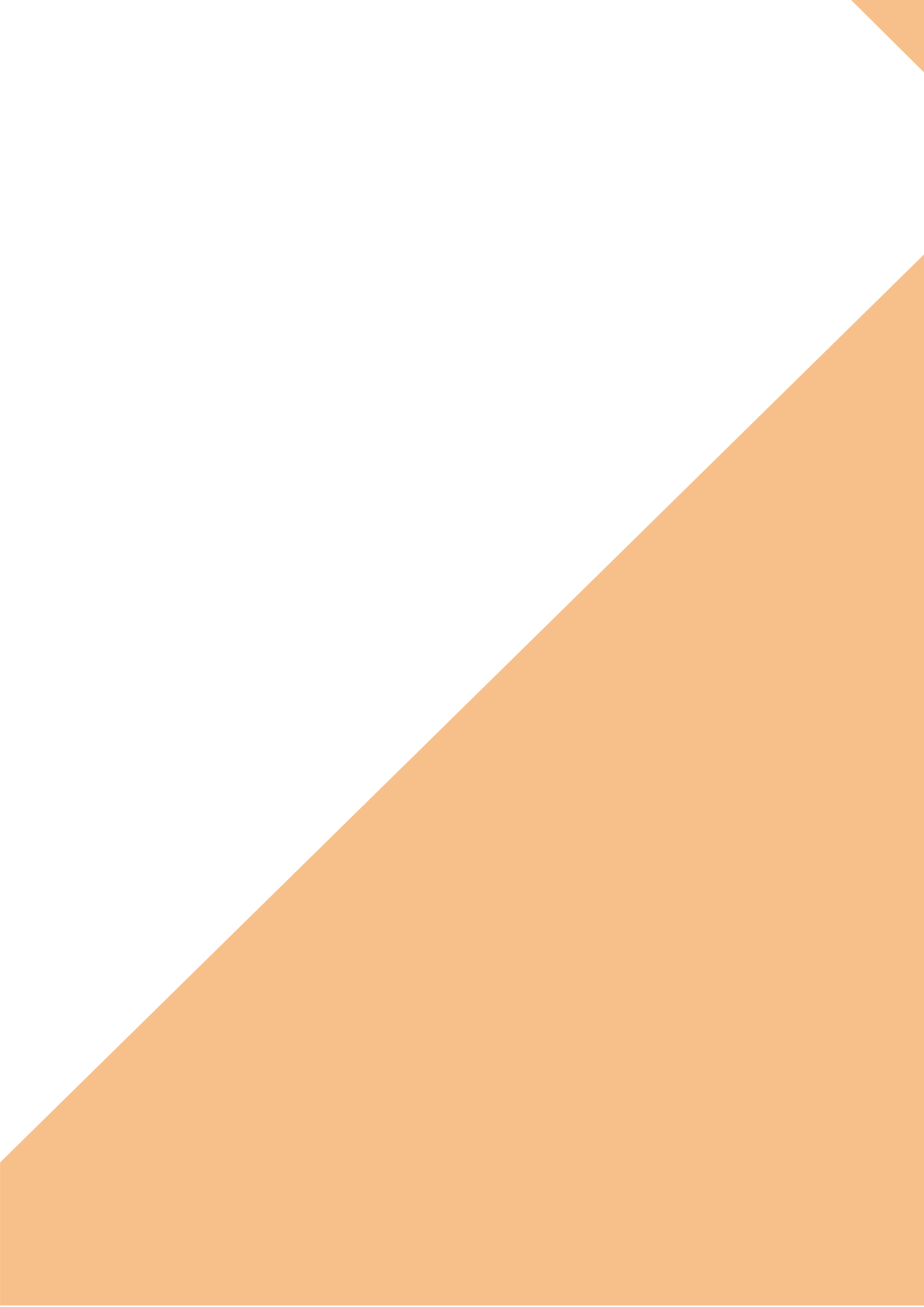
The “Operational Guidelines for Wildlife Checkpoints” is composed of twenty-five (25) pages which outlines the:

1. General Procedures at Wildlife Checkpoints
2. General Procedures for Permit Use and Management
3. Check-in-Transit Procedures
4. Procedures related to Wildlife Breaches
5. Examples of the relevant documents at a Wildlife Checkpoints

6. Preparation of Standard Operating Procedures (SOPs) for divisions of GWCMC in relation to domestic licences



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6. Preparation of Standard Operating Procedures (SOPs) for divisions of GWCMC in relation to domestic licences

The two main operational divisions that requires operational guidelines are the Licensing and Permitting Division (L&PD) and the Monitoring and Compliance Divisions (M&CD). For both divisions, focus group interviews with key staff

were conducted to ascertain the main operational procedures related to the licence system. These procedures were documented and systematically recorded in the operational guidelines for each division.

FIGURE 10.
Operational Guidelines cover pages

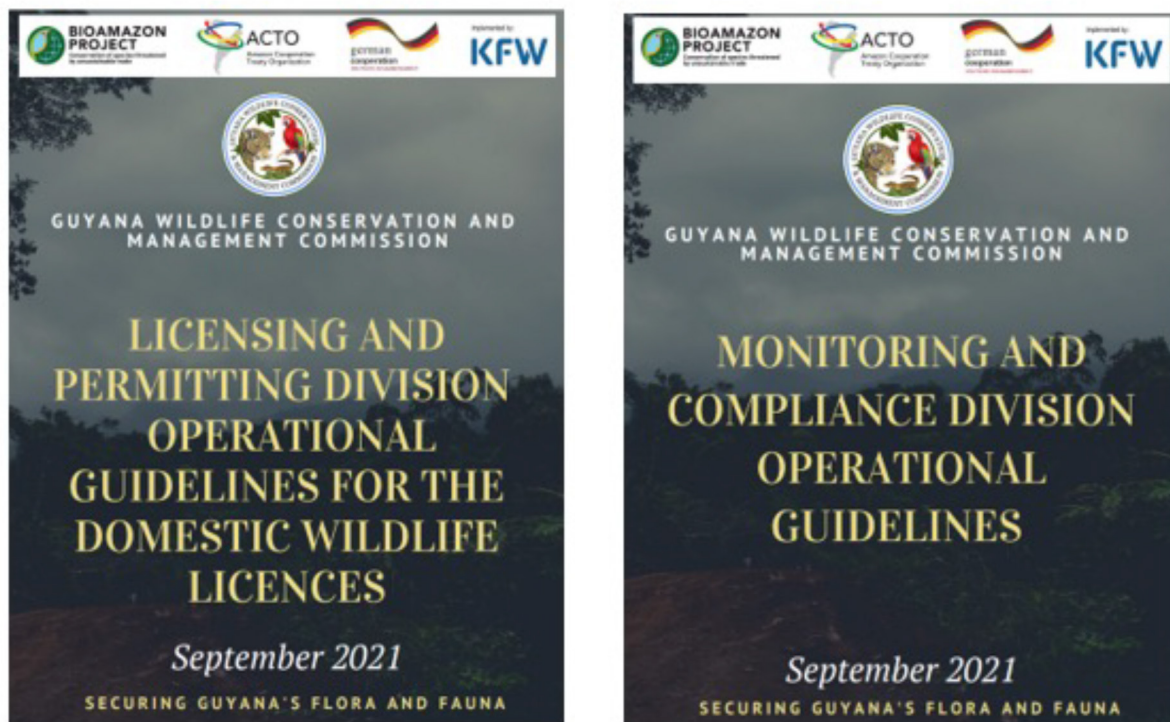


Figure Source: Gavin Agard

The Standard Operating Procedures for the Licensing and Permitting Division consist of twenty-four (24) pages which specifies the requirements for each licence type, the steps involved in approving each licence type and a summary of the guidelines for updating the licence database.

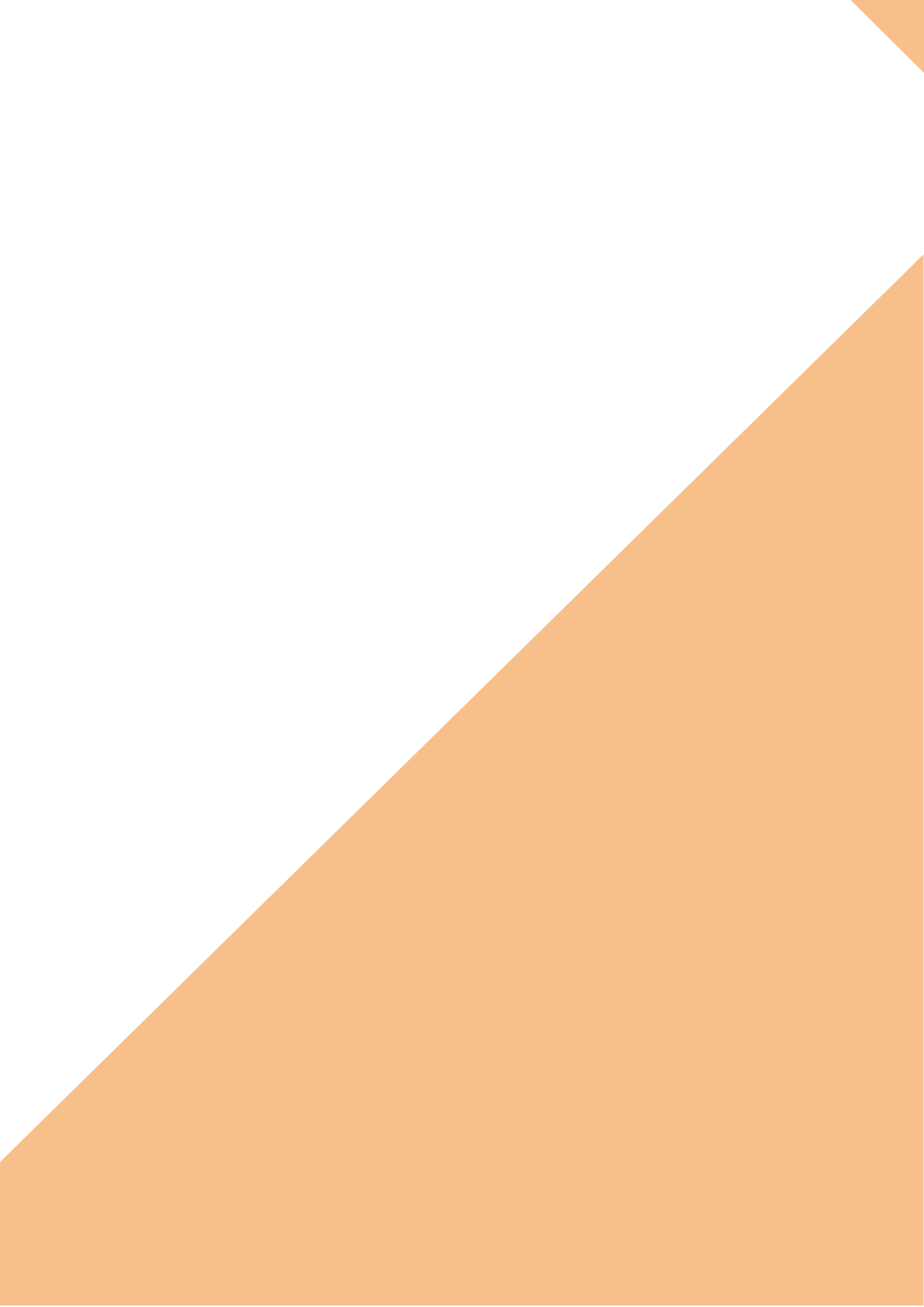
The Standard Operating Procedures for the Monitoring and Compliance Division consist of thirty- three (33) pages which specifies the procedures related to the monitoring and compliance of licensed operators. It specifies the type of inspection forms, frequency of monitoring inspection, data capture guidelines as well as monitoring and reporting requirements.

The availability of the SOP helps to promote accountability and transparency of operations within the divisions as well as ensuring employees understand how to accomplish their assigned tasks consistently.

7. Design and implement a database to capture domestic wildlife licence operators



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7. Design and implement a database to capture domestic wildlife licence operators

The digital system for licensing the domestic wildlife trade is called the Domestic Licence Management System (DLMS). The main module of this system allows for the management of the domestic licencing process through an

online database that can be accessed through the GWCMC website. The database is being hosted by the GWCMC.

FIGURE 11.
Home Page of the Domestic Wildlife Application

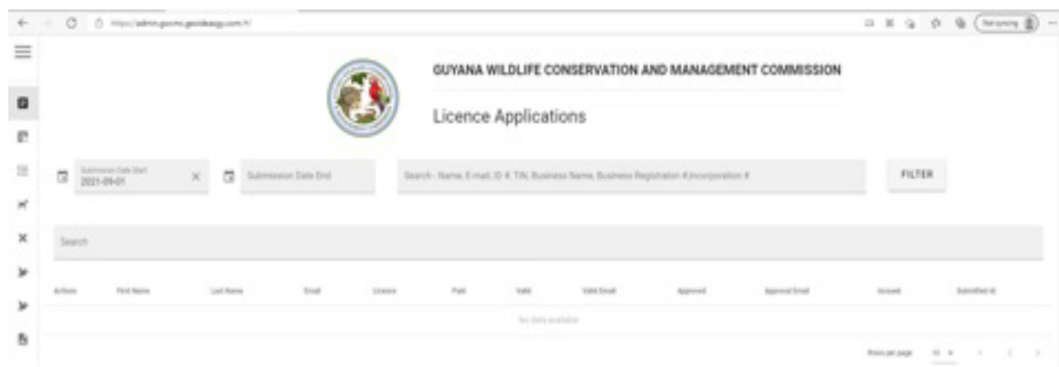


Figure Source: Gavin Agard

The DLMS consist of three applications:

1. Licence Admin Portal (LAP),
2. Wildlife Application Portal (WAP) and
3. Licence Management System API(LMSAPI).

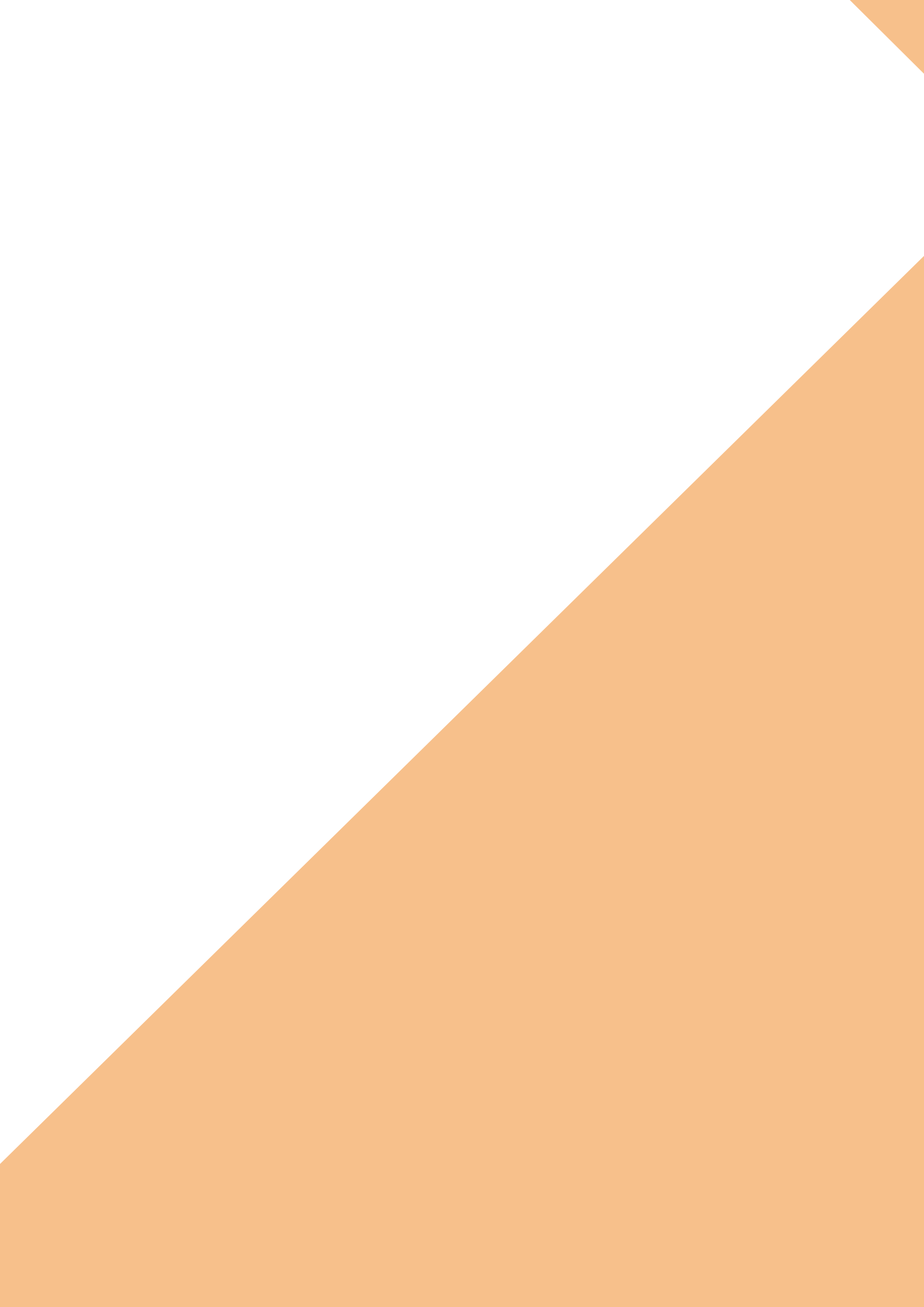
The WAP digitizes the licence application process by allowing the general public to submit applications using a website. The LAP enables the staff of the GWCMC to manage the licensing process, staff accounts and generate reports.



8. Conclusion



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8. Conclusion

The project titled “Build capacity for the Management of the Domestic Wildlife Trade in Guyana” was successfully completed.

Throughout the project an awareness campaign was sufficiently achieved through the utilization of traditional and digital channels. Radio was used to share the message of the Domestic Licensing System to traditional audiences in the main geographical target areas (Berbice, Demerara, Essequibo and Linden). Hinterland areas received recorded Public Service Announcements (PSAs) with the same information.

Facebook was the main social media platform used as it is the platform with the largest use among the Guyana population. While the organic reach for content posted was fair, for greater reach, paid distribution can be utilised in the future as well as a strategic schedule that spans the period in focus and pays attention peak posting times.

The determination of harvest quotas for selected species and harvest zones are critical for the management of the domestic wildlife trade in Guyana. As the harvest quotas are implemented, data collection on efforts and harvest together

with biological data (reproductive state for example) and ecological data should be collected and used to evaluate the quotas for the next cycle of implementation.

The staff of the GWCMC were instrumental in facilitating the successful completion of all activities. The capacity building initiatives completed through this project should be viewed as foundation on which additional building blocks need to be added. The operational guidelines must also be viewed as a fluid document that can be updated as lessons learnt during the implementation phase commences.

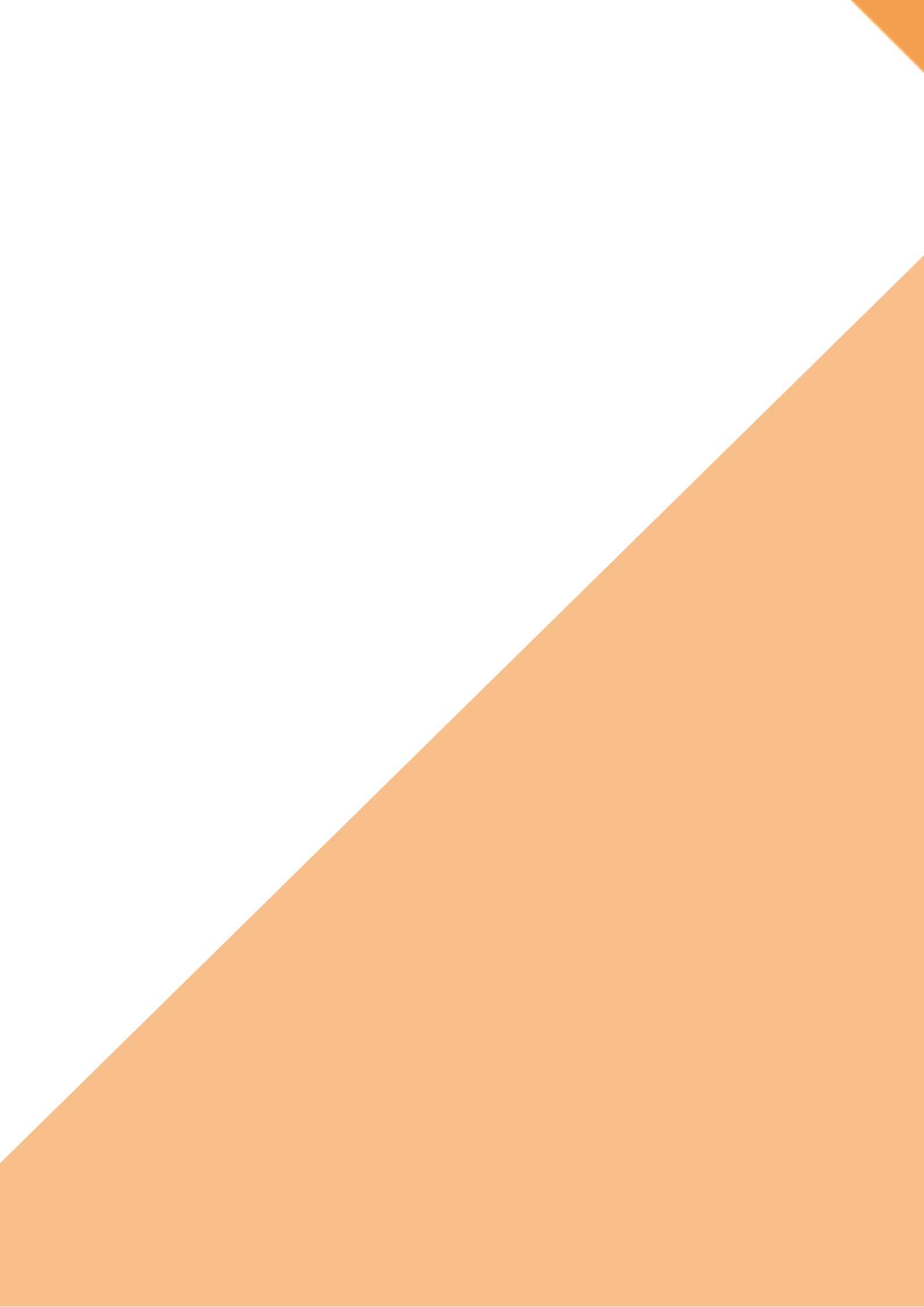
Although the Memorandum of Understanding between the GWCMC and other agencies is a positive first step, the GWCMC must make additional efforts to secure permanent staff to perform its duties within the hinterland regions of Guyana.

The consensus from the regional stakeholder engagement sessions is that community members are supportive of the domestic wildlife licence system but further engagement from representatives from the GWCMC will be needed to clarify concerns or questions that may arise in the future.

9. References



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9. References

- Altrichter, M., Drews, C., Carrillo, E., & Sáenz, J. (2001). Sex ratio and breeding of white-lipped peccaries *Tayassu pecari* (Artiodactyla: Tayassuidae) in a Costa Rican rain forest. *Revista de biología tropical*, 49(1), 383–389.
- Anacleto, T.C.S., Arteaga, M., Superina, M. & Abba, A.M. (2014). *Dasypus kappleri*. The IUCN Red List of Threatened Species 2014: e.T6289A47440608. Retrieved from: <https://dx.doi.org/10.2305/IUCN.UK.2014-1.RLTS.T6289A47440608.en>
- Anacleto, T.C.S., Miranda, F., Medri, I., Cuellar, E., Abba, A.M. & Superina, M. (2014). *Priodontes maximus*. The IUCN Red List of Threatened Species 2014: e.T18144A47442343. <https://dx.doi.org/10.2305/IUCN.UK.2014-1.RLTS.T18144A47442343.en>
- Anacleto, T.C.S., Moraes Tomas, W. & Superina, M. (2014). *Cabassous unicinctus*. The IUCN Red List of Threatened Species 2014: e.T3415A47437949. <https://dx.doi.org/10.2305/IUCN.UK.2014-1.RLTS.T3415A47437949.en>
- Animalia. (2021). White-tailed Deer - Facts, Diet, Habitat & Pictures on Animalia.bio. Retrieved from: <https://animalia.bio/white-tailed-deer#population>
- Apan-Araujo, G. L., González, S. A., Molina-Martínez, A., Jiménez G, D., & Villarreal E.B, O. A. (2018). Comparison of three models of population density estimation for Central American red brocket deer (*Mazama temama*). *UNED Research Journal*, 10(1). <https://doi.org/10.22458/urj.v10i1.2010>
- Beck-King, H., von Helversen, O., & Beck-King, R. (1999). Home range, population density, and food resources of agouti paca (rodentia: Agoutidae) in costa rica: A study using alternative methods. *Biotropica*, 31(4), 675–685. <https://doi.org/10.1111/j.1744-7429.1999.tb00417.x>
- BirdLife International. (2016). *Craxa alector*. The IUCN Red List of Threatened Species 2016: e.T22678534A92777326. <https://dx.doi.org/10.2305/IUCN.UK.2016-3.RLTS.T22678534A92777326.en>
- BirdLife International. (2016). *Dendrocygna viduata*. The IUCN Red List of Threatened Species 2016: e.T22679763A92829021. <https://dx.doi.org/10.2305/IUCN.UK.2016-3.RLTS.T22679763A92829021.en>
- BirdLife International. (2017). *Tinamus major* (amended version of 2016 assessment). The IUCN Red List of Threatened Species 2017: e.T22678148A110915916. <https://dx.doi.org/10.2305/IUCN.UK.2017-1.RLTS.T22678148A110915916.en>
- BirdLife International. (2018). *Dendrocygna autumnalis*. The IUCN Red List of Threatened Species 2018: e.T22679780A131907111. <https://dx.doi.org/10.2305/IUCN.UK.2018-2.RLTS.T22679780A131907111.en>

- BirdLife International. (2021). Black-bellied whistling-duck (*dendrocygna autumnalis*) - BirdLife species factsheet. BirdLife International: Data Zone. <http://datazone.birdlife.org/species/factsheet/black-bellied-whistling-duck-dendrocygna-autumnalis/text>
- Bock, B., Malone, C.L., Knapp, C., Aparicio, J., Avila-Pires, T.C.S., Cacciali, P., Caicedo, J.R., Chaves, G., Cisneros-Heredia, D.F., Gutiérrez-Cárdenas, P., Lamar, W., Moravec, J., Perez, P., Porras, L.W., Rivas, G., Scott, N., Solórzano, A. & Sunyer, J. 2020. Iguana iguana (amended version of 2018 assessment). The IUCN Red List of Threatened Species 2020: e.T174481A174437922. <https://dx.doi.org/10.2305/IUCN.UK.2020-2.RLTS.T174481A174437922.en>.
- Bock, B. C., Paez, V. P., Rand, A. S., & Burghardt, G. M. (2016). Life tables and stochastic matrix projection analysis for a population of green iguanas (*Iguana iguana*): Implications for conservation and control. *Herpetological Conservation and Biology*, 11(Monograph 6), 47–60.
- Braun, M. J., Finch, D. W., Robbins, M. B., & Schmidt, B. K. (2007). A field checklist of the birds of Guyana (2nd ed.). Smithsonian Institution.
- Bureau of Statistics (Guyana). (2014). Guyana population & housing census 2012: Preliminary report. Government of Guyana.
- Chapman, C. A. (1991). Reproductive biology of captive capybaras. *Journal of Mammalogy*, 72(1), 206–208. <https://doi.org/10.2307/1382000>
- CITES. (2021). Checklist of CITES species. [https://checklist.cites.org/#/en/search/](https://checklist.cites.org/#/en/search/output_layout=alphabetical&level_of_listing=0&show_synonyms=1&show_author=1&show_english=1&show_spanish=1&show_french=1&scientific_name=&page=1&per_page=20)
- output_layout=alphabetical&level_of_listing=0&show_synonyms=1&show_author=1&show_english=1&show_spanish=1&show_french=1&scientific_name=&page=1&per_page=20
- City Population. (2020, May 16). Guyana: Regions & major places - population statistics, maps, charts, weather and web information. <https://www.citypopulation.de/en/guyana/>
- Cosse, M., & González, S. (2013). Demographic characterization and social patterns of the neotropical pampas deer. *SpringerPlus*, 2(259), 1–10. <https://doi.org/10.1186/2193-1801-2-259>
- Ducks Unlimited. (2021). Blue-winged Teal | Types of Ducks & Geese. Ducks.org. <https://www.ducks.org/hunting/waterfowl-id/blue-winged-teal>
- Duplaix, N. (2001). Evaluation of the animal and plant trade in the guianas: Preliminary findings (No. GFCEP06). WWF-Guianas.
- Eisenberg, J. F. (1980). The density and biomass of tropical mammals. In M. E. Soule & B. Wilcox (Eds.), *Conservation biology: An Evolutionary-Ecological perspective* (Reissue ed., pp. 35–56). Sinauer Associates Inc.
- el Bizri, H., Fa, J., Bowler, M., Valsecchi, J., Bodmer, R., & Mayor, P. (2018). Breeding seasonality in the lowland paca (*Cuniculus paca*) in Amazonia: interactions with rainfall, fruiting, and sustainable hunting. *Journal Of Mammalogy*, 99(5), 1101–1111. <https://doi.org/10.1093/jmammal/gyy102>

- F., L. M. (2003). Age structure of two hunted peccary species in the Bolivian Chaco (*Tayassu tajacu* and *T. pecari*). *Mammalia*, 67(4), 575–578. <https://doi.org/10.1515/mamm-2003-0412>
- Ferreguetti, Á., Tomás, W., & Bergallo, H. (2015). Density, occupancy, and activity pattern of two sympatric deer (*Mazama*) in the Atlantic Forest, Brazil. *Journal Of Mammalogy*, 96(6), 1245–1254. <https://doi.org/10.1093/jmammal/gyv132>
- Ferreguetti, A., Tomas, W., & Bergallo, H. (2018). Density, habitat use, and daily activity patterns of the Red-rumped Agouti (*Dasyprocta leporina*) in the Atlantic Forest, Brazil. *Studies On Neotropical Fauna and Environment*, 53(2), 143–151. <https://doi.org/10.1080/01650521.2018.1434743>
- Frens, K. (2020). *Hydrochoerus hydrochaeris* (capybara). *Animal Diversity Web*. https://animaldiversity.org/accounts/Hydrochoerus_hydrochaeris/#habitat
- Gallina-Tessaro, S., López-Tello, E., & Mandujano, S. (2019). Chapter 15: Recent studies of White-Tailed deer in the neotropics. In S. Gallina-Tessaro (Ed.), *Ecology and conservation of tropical ungulates in latin america* (pp. 371–393). Springer Nature Switzerland AG. <https://doi.org/10.1007/978-3-030-28868-6>
- Gerardo, A., Cordero, R., & Ojasti, J. (1981). Comparison of capybara populations of open and forested habitats. *The Journal of Wildlife Management*, 45(1), 267–271. <https://doi.org/10.2307/3807900>
- Gottdenker, N., & Bodmer, R. E. (1998). Reproduction and productivity of white-lipped and collared peccaries in the peruvian amazon. *Journal of Zoology*, 245(4), 423–430. <https://doi.org/10.1111/j.1469-7998.1998.tb00116.x>
- Guyana Forestry Commission. (2018). Revised national forestry policy statement 2018. Government of Guyana.
- Guyana Lands and Surveys Commission. (2013, August). Guyana national land use plan. Government of Guyana.
- Guyana Wildlife Conservation and Management Commission (GWCMC). (2006–2017). National quota utilization 2005–2016 [Dataset]. Guyana Wildlife Conservation and Management Commission.
- Hallett, M. T., Kinahan, A. A., McGregor, R., Baggallay, T., Babb, T., Barnabus, H., Wilson, A., Li, F. M., Boone, W. W., & Bankovich, B. A. (2019). Impact of Low-Intensity hunting on game species in and around the kanuku mountains protected area, Guyana. *Frontiers in Ecology and Evolution*, 7. <https://doi.org/10.3389/fevo.2019.00412>
- Herrera, E. A., Salas, V., Congdon, E. R., Corriale, M. J., & Tang-Martínez, Z. (2011). Capybara social structure and dispersal patterns: Variations on a theme. *Journal of Mammalogy*, 92(1), 12–20. <https://doi.org/10.1644/09-mamm-s-420.1>
- Huanca-Huarachi, G., Herrera, J. C., & Noss, A. J. (2011). Population density and habitat use of the paca (*Cuniculus paca*) in the north of the Amboró-Carrasco conservation complex. *Ecología En Bolivia [Online]*, 46(1), 4–13. <http://www.scielo.org.bo/pdf/>

- Jorge, M. S. P., & Peres, C. A. (2005). Population density and home range size of Red-Rumped agoutis (*Dasyprocta leporina*) within and outside a natural brazil nut stand in southeastern amazonia. *Biotropica*, 37(2), 317–321. <https://doi.org/10.1111/j.1744-7429.2005.00041.x>
- Kirschbaum, K., & Moore, K. (2002). *Actitis macularius* (spotted sandpiper). Animal Diversity Web. https://animaldiversity.org/accounts/Actitis_macularius/
- Kriebel, D., Tickner, J., Epstein, P., Lemons, J., Levins, R., Loechler, E. L., Quinn, M., Rudel, R., Schettler, T., & Stoto, M. (2001). The precautionary principle in environmental science. *Environmental Health Perspectives*, 109(9), 871–876. <https://doi.org/10.1289/ehp.01109871>
- Loughry, J., McDonough, C. & Abba, A.M. (2014). *Dasypus novemcinctus*. The IUCN Red List of Threatened Species 2014: e.T6290A47440785. <https://dx.doi.org/10.2305/IUCN.UK.2014-1.RLTS.T6290A47440785.en>
- Macdonald, G. (2013). *Cuniculus paca* (lowland paca). Animal Diversity Web. https://animaldiversity.org/accounts/Cuniculus_paca/
- Mayor, P., Bodmer, R., López-Béjar, M., & López-Plana, C. (2011). Reproductive biology of the wild red brocket deer (*Mazama americana*) female in the peruvian amazon. *Animal Reproduction Science*, 128, 123–128. <https://doi.org/10.1016/j.anireprosci.2011.09.009>
- Mayor, P., Le Pendu, Y., Guimarães, D. A., Silva, J. V. D., Tavares, H. L., Tello, M., Pereira, W., López-Béjar, M., & Jori, F. (2006). A health evaluation in a colony of captive collared peccaries (*Tayassu tajacu*) in the eastern amazon. *Research in Veterinary Science*, 81(2), 246–253. <https://doi.org/10.1016/j.rvsc.2005.12.003>
- Meshaka, W. E., Jr., Smith, H. T., Golden, E., Moore, J. A., Fitchett, S., Cowan, E. M., Engeman, R. M., Sekscienski, S. R., & Cress, H. L. (2007). Green iguana (*Iguana iguana*): The unintended consequence of sound wildlife management practices in a south Florida park. *Herpetological Conservation and Biology*, 2(2), 149–156.
- Mongabay. (2020, April 17). Deforestation statistics for Guyana. <https://rainforests.mongabay.com/deforestation/archive/Guyana.htm>
- Munoz, E. M., Ortega, A. M., Bock, B. C., & Paez, V. P. (2003). Demografía y ecología de anidación de la iguana verde, iguana iguana (squamata: Iguanidae), en dos poblaciones explotadas en la depresión momposina, Colombia. *Revista de Biología Tropical*, 51(1), 229–240.
- Ojasti, J. (1996). Wildlife Utilization in Latin America: Current Situation and Prospects for Sustainable Management. (FAO Conservation Guide - 25). [fao.org. https://www.fao.org/3/t0750e/t0750e0n.htm](https://www.fao.org/3/t0750e/t0750e0n.htm)
- Palmer, B. (2009, August 14). 7 billion carbon sinks. *Slate Magazine*. <https://slate.com/news-and-politics/2009/08/are-you-heating-the-planet-when-you-breathe.html>
- Panthera Guyana. (2016). Wildlife of Guyana species profiles to promote sustainable harvest & management. Panthera.

Piccolo, B. P., van Deelen, T. R., Hollis-Etter, K., Etter, D. R., Warner, R. E., & Anchor, C. (2010). Behavior and survival of white-tailed deer neonates in two suburban forest preserves. *Canadian Journal of Zoology*, 88(5), 487–495. <https://doi.org/10.1139/z10-026>

Protected Areas Trust (Guyana). (2021). Protected areas. <https://protectedareatrust.org.gy/protected-areas/>

Rosser, A. R., & Haywood, M. J. (Eds.). (2002). Guidance for CITES scientific authorities: Checklist to assist in making non-detriment findings for appendix II exports. International Union for Conservation of Nature and Natural Resources.

Shaffer, C. A., Yukuma, C., Marawanaru, E., & Suse, P. (2017). Assessing the sustainability of Waiwai subsistence hunting in Guyana by comparison of static indices and spatially explicit, biodemographic models. *Animal Conservation*, 21(2), 148–158. <https://doi.org/10.1111/acv.12366>

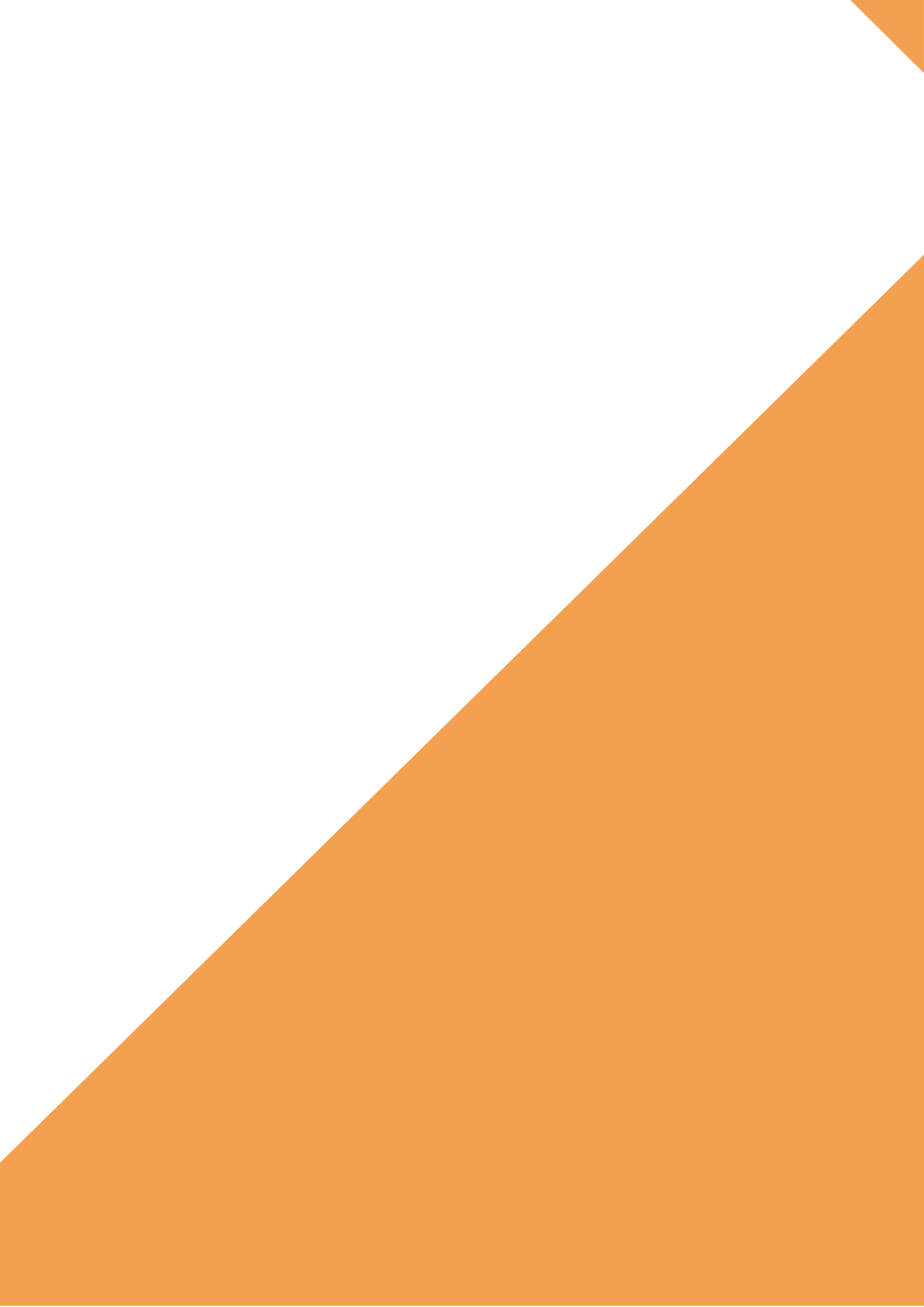
Weinbaum, K. Z., Brashares, J. S., Golden, C. D., & Getz, W. M. (2012). Searching for sustainability: Are assessments of wildlife harvests behind the times? *Ecology Letters*, 16(1), 99–111. <https://doi.org/10.1111/ele.12008>

Withers, N. (n.d.). How much does human breathing contribute to climate change? BBC Science Focus Magazine. <https://www.sciencefocus.com/planet-earth/how-much-does-human-breathing-contribute-to-climate-change/>

10. Bibliography



CITES MODULE



10. Bibliography

A list of literature consulted but not specifically referred to in the text of the report.

Aliaga-Rossel, E., Kays, R. W., & Fragoso, J. M. V. (2008). Home-Range Use by the Central American Agouti (*Dasyprocta punctata*) on Barro Colorado Island, Panama. *Journal of Tropical Ecology*, 24(4), 367–374. Retrieved from: <http://www.jstor.org/stable/25172938>

Alvarez, M. R., & Kravetz, F. O. (2006). Reproductive performance of capybaras (*Hydrochoerus hydrochaeris*) in captivity under different management systems in Argentina. *Animal Research*, 55(2), 153–164. <https://doi.org/10.1051/animres:2006005>

Andres, B. A., Smith, P. A., Morrison, R. I. G., Gratto-Trevor, C. L., Brown, S. C., and Friis, C. A. (2012). Population estimates of North American shorebirds, 2012. *Wader Study Group Bulletin* 119. Pages 178–194. Retrieved from: https://www.researchgate.net/publication/258326548_Population_estimates_of_North_American_shorebirds_2012

Animalia. (2021). Capybara - Facts, Diet, Habitat & Pictures on Animalia.bio. Retrieved from: <https://animalia.bio/capybara#mating>

Animalia. (2021). Collared Peccary - Facts, Diet, Habitat & Pictures on Animalia.bio.

Retrieved from: <https://animalia.bio/collared-peccary#distribution>

Animalia. (2021). Giant Armadillo - Facts, Diet, Habitat & Pictures on Animalia.bio. Retrieved from: <https://animalia.bio/giant-armadillo#mating>

Animalia. (2021). Nine-Banded Armadillo - Facts, Diet, Habitat & Pictures on Animalia.bio. Retrieved from: <https://animalia.bio/nine-banded-armadillo#population>

Animalia. (2021). Paca - Facts, Diet, Habitat & Pictures on Animalia.bio. Retrieved from: <https://animalia.bio/lowland-paca>
Animalia. (2021). Red Brocket - Facts, Diet, Habitat & Pictures on Animalia.bio. Retrieved from: <https://animalia.bio/red-brocket#facts>

Animalia. (2021). Red-rumped Agouti - Facts, Diet, Habitat & Pictures on Animalia.bio. Retrieved from: <https://animalia.bio/red-rumped-agouti#refs>

Animalia. (2021). Spotted Sandpiper - Facts, Diet, Habitat & Pictures on Animalia.bio. Retrieved from: <https://animalia.bio/spotted-sandpiper#description>

Animalia. (2021). White-lipped Peccary - Facts, Diet, Habitat & Pictures on Animalia.bio. Retrieved from: <https://animalia.bio/white-lipped-peccary#distribution>

Aya-Cuero, C., Chacón-Pacheco, J., & Anacleto, T. (2019). *Dasyus kappleri*

(Cingulata: Dasypodidae). *Mammalian Species*, 51(977), 51-60. Retrieved from: <https://doi.org/10.1093/mspecies/sez009>

Aya-Cuero, C., Rodríguez-Bolaños, A., & Superina, M. (2017). Population density, activity patterns, and ecological importance of giant armadillos (*Prionomys maximus*) in Colombia. *Journal Of Mammalogy*, 98(3), 770-778. Retrieved from: <https://doi.org/10.1093/jmammal/gyx006>

BirdLife International. (2016). *Actitis macularius*. The IUCN Red List of Threatened Species 2016: e.T22693277A93394194. Retrieved from: <https://dx.doi.org/10.2305/IUCN.UK.2016-3.RLTS.T22693277A93394194.en>

BirdLife International. (2016). *Anas bahamensis*. The IUCN Red List of Threatened Species 2016: e.T22680287A92853819. Retrieved from: <https://dx.doi.org/10.2305/IUCN.UK.2016-3.RLTS.T22680287A92853819.en>

BirdLife International. (2016). *Penelope jacquacu*. The IUCN Red List of Threatened Species 2016: e.T22678386A92771552. Retrieved from: <https://dx.doi.org/10.2305/IUCN.UK.2016-3.RLTS.T22678386A92771552.en>

BirdLife International. (2016). *Penelope marail*. The IUCN Red List of Threatened Species 2016: e.T22678367A92770105. Retrieved from: <https://dx.doi.org/10.2305/IUCN.UK.2016-3.RLTS.T22678367A92770105.en>

BirdLife International. (2016). *Psophia crepitans*. The IUCN Red List of Threatened Species 2016: e.T45478181A95158441. Retrieved from: <https://dx.doi.org/10.2305/IUCN.UK.2016-3.RLTS.T45478181A95158441.en>

BirdLife International. (2018). *Cairina moschata*. The IUCN Red List of Threatened Species 2018: e.T22680061A131911211. Retrieved from: <https://dx.doi.org/10.2305/IUCN.UK.2018-2.RLTS.T22680061A131911211.en>

BirdLife International. (2018). *Dendrocygna autumnalis*. The IUCN Red List of Threatened Species 2018: e.T22679780A131907111. Retrieved from: <https://dx.doi.org/10.2305/IUCN.UK.2018-2.RLTS.T22679780A131907111.en>

BirdLife International. (2020). *Anas carolinensis*. The IUCN Red List of Threatened Species 2020: e.T22729498A181562690. Retrieved from: <https://dx.doi.org/10.2305/IUCN.UK.2020-3.RLTS.T22729498A181562690.en>

BirdLife International. (2021). *Marail Guan (Penelope marail)* - BirdLife species factsheet. [Datazone.birdlife.org](http://datazone.birdlife.org/species/factsheet/marail-guan-penelope-marail/details). Retrieved from: <http://datazone.birdlife.org/species/factsheet/marail-guan-penelope-marail/details>

BirdLife International. (2021). *Muscovy Duck (Cairina moschata)* - BirdLife species factsheet. [Datazone.birdlife.org](http://datazone.birdlife.org/species/factsheet/22680061). Retrieved from: <http://datazone.birdlife.org/species/factsheet/22680061>

BirdLife International. (2021). *White-throated Tinamou (Tinamus guttatus)* - BirdLife species sheet. [Datazone.birdlife.org](http://datazone.birdlife.org/species/factsheet/white-throated-tinamou-tinamus-guttatus/text). Retrieved from: <http://datazone.birdlife.org/species/factsheet/white-throated-tinamou-tinamus-guttatus/text>

- BirdLife International. (2021). *Spatula discors* - The IUCN Red List of Threatened Species. Retrieved from: <https://www.iucnredlist.org/species/22680229/137731845>
- Black-Decima, P.A. & Vogliotti, A. (2016). *Mazama gouazoubira*. The IUCN Red List of Threatened Species 2016: e.T29620A22154584. Retrieved from: <https://dx.doi.org/10.2305/IUCN.UK.2016-2.RLTS.T29620A22154584.en>
- Bonato, V., Martins, E., Machado, G., da-Silva, C., & dos Reis, S. (2008). Ecology of the Armadillos *Cabassous unicinctus* and *Euphractus sexcinctus* (Cingulata: Dasypodidae) in a Brazilian Cerrado. *Journal Of Mammalogy*, 89(1), 168-174. Retrieved from: <https://doi.org/10.1644/06-mamm-a-187.1>
- Briceño-Méndez, M., Naranjo, E., Mandujano, S., Altricher, M., & Reyna-Hurtado, R. (2016). Responses of two sympatric species of peccaries (*Tayassu pecari* and *Pecari tajacu*) to hunting in calakmul, Mexico. *Tropical Conservation Science*, 9(3), 1–11. <https://doi.org/10.1177/1940082916667331>
- Burton, M., & Burton, R. (2002). *International Wildlife Encyclopedia* (3rd ed., pp. 2756-2757). Marshall Cavendish Corporation. Retrieved from: https://books.google.gy/books?id=48xNSM_
- Cain, J. (2017). *Anas bahamensis* (Online), Animal Diversity Web. Retrieved from: https://animaldiversity.org/accounts/Anas_bahamensis/
- Capizzo, A., Moses, E., Shirley, E., & Myers, P. (2013). Long-nosed Armadillos articles- *Encyclopedia of Life*. Eol.org. Retrieved from: <https://eol.org/pages/7630/articles>
- Clarke, K. (2014). Black-bellied Whistling-Duck- *Dendrocygna autumnalis*. Kester Clarke Wildlife Photography. Retrieved from: <https://www.kesterclarke.com/galleries/birds-of-guyana/ducks/black-bellied-whistling-duck/>
- Clarke, K. (2015). White-faced Whistling-duck - *Dendrocygna viduata*. Kester Clarke Wildlife Photography. Retrieved from: <https://www.kesterclarke.com/galleries/birds-of-guyana/ducks/white-faced-whistling-duck/>
- Clarke, K. (2017). Blue-winged Teal - *Anas discors*. Kester Clarke Wildlife Photography. Retrieved from: <https://www.kesterclarke.com/galleries/birds-of-guyana/ducks/blue-winged-teal/>
- Compare Birds. (2021). About Marail guan | Facts. *Birds.comparespecies.com*. Retrieved from: <https://birds.comparespecies.com/en/about-marail-guan/model-843-0>
- Cornell University. (2019). Black-bellied Whistling-Duck Range Map, All About Birds, Cornell Lab of Ornithology. Retrieved from: https://www.allaboutbirds.org/guide/Black-bellied_Whistling-Duck/maps-range
- Cornell University. (2019). Green-winged Teal Life History, All About Birds, Cornell Lab of Ornithology. Retrieved from: https://www.allaboutbirds.org/guide/Green-winged_Teal/lifehistory
- Cornell University. (2019). Spotted Sandpiper Life History, All About Birds, Cornell Lab of Ornithology. Retrieved from: <https://www.allaboutbirds.org/>

- guide/Spotted_Sandpiper/lifehistory
Csomos, R. (2001). *Tayassu pecari* (Online), Animal Diversity Web. Retrieved from: https://animaldiversity.org/accounts/Tayassu_pecari/#geographic_range
- Del Hoyo, J. and G. M. Kirwan (2020). Marail Guan (*Penelope marail*), version 1.0. In *Birds of the World* (J. del Hoyo, A. Elliott, J. Sargatal, D. A. Christie, and E. de Juana, Editors). Cornell Lab of Ornithology, Ithaca, NY, USA. Retrieved from: <https://doi.org/10.2173/bow.margua1.01>
- Del Hoyo, J., & Kirwan, G. (2020). Spix's Guan (*Penelope jacquacu*). *Birds Of The World*. Retrieved from: <https://doi.org/10.2173/bow.spigua1.01>
- Denis, T. (2016). Geomorphology predicts Black Curassow density. Retrieved from: <https://bou.org.uk/blog-denis-black-curassow/>
- Desbiez, A. (2007). *Wildlife Conservation in the Pantanal: Habitat Alteration, Invasive Species and Bushmeat Hunting*. Ph.D. Thesis. University of Kent.
- Dewey, T. (2003). *Odocoileus virginianus* (Online), Animal Diversity Web. Retrieved from: https://animaldiversity.org/accounts/Odocoileus_virginianus/
- Duarte, J.M.B & Vogliotti, A. (2016). *Mazama americana*. The IUCN Red List of Threatened Species 2016: e.T29619A22154827. Retrieved from: <https://dx.doi.org/10.2305/IUCN.UK.2016-1.RLTS.T29619A22154827.en>
- Dubost, G. (1998). *Ecology and Social Life of the Red Acouchy, Myoprocta exilis*; comparison with the orange-rumped agouti, *Dasyprocta leporina*. *Journal of Zoology*, 214. Pages 107-123.
- Ducks Unlimited. (2021). *Green-winged Teal | Types of Ducks & Geese*. Ducks.org. Retrieved from: <https://www.ducks.org/hunting/waterfowl-id/green-winged-teal>
- Eisenberg, J.F. and Redford, K.H. (1999). *Mammals of the Neotropics, The Central Neotropics* (Vol. 3). The University of Chicago Press, Chicago, USA.
- el Bizri, H. R., Monteiro, F. O. B., de Andrade, R. D. S., Valsecchi, J., Guimarães, D. A. D. A., & Mayor, P. (2017). Embryonic and fetal morphology in the lowland paca (*Cuniculus paca*): A precocial hystricomorph rodent. *Theriogenology*, 104, 7–17. <https://doi.org/10.1016/j.theriogenology.2017.08.004>
- Emmons, L. & Reid, F. (2016). *Dasyprocta leporina*. The IUCN Red List of Threatened Species 2016: e.T89497102A22197762. Retrieved from: <https://dx.doi.org/10.2305/IUCN.UK.2016-2.RLTS.T89497102A22197762.en>
- Emmons, L. (2016). *Cuniculus paca*. The IUCN Red List of Threatened Species 2016: e.T699A22197347. Retrieved from: <https://dx.doi.org/10.2305/IUCN.UK.2016-2.RLTS.T699A22197347.en>
- Environmental Protection Agency. (2016). *State of the Environment Report 2016 [PDF]*. EPA Guyana and the Ministry of Natural Resources (MNR).
- Ferreguetti, A. C., Pereira, B. C., & Bergallo, H. G. (2018). Assessing the population density of the spotted paca, *Cuniculus paca*, (rodentia: Cuniculidae)

- on an atlantic forest island, southeastern Brazil. *Zoologia*, 35, 1–5. <https://doi.org/10.3897/zoologia.35.e23133>
- Figuerola-de-Leon, A., Naranjo, E. J., Perales, H., Santos-Moreno, A., & Lorenzo, C. (2017). Abundance, density and habitat use of lowland paca (*Cuniculus paca*, rodentia: Cuniculidae) in the lacandon rainforest, chiapas, mexico. *THERYA*, 8(3), 199–208. <https://doi.org/10.12933/therya-17-460>
- Fleck, D.W., & Voss, R.S. (2016). Indigenous knowledge about the greater long-nosed armadillo, *Dasypus kappleri* (Xenarthra: Dasypodidae), in northeastern Peru [PDF]. ISSN 1852-9208
- Gaidet, N., Dodman, T., Caron, A., Balanca, G., Desvaux, S., Goutard, F., Cattoli, G., Lamarque, F., Hagemeyer, W. and Monicat, F. (2007). Avian Influenza Viruses in Water Birds, Africa. *Emerging Infectious Diseases*, Vol. 13(4). Pages 626–629. Retrieved from: https://wwwnc.cdc.gov/eid/article/13/4/06-1011_article
- Gallina, S. and Lopez Arevalo, H. (2016). *Odocoileus virginianus*. The IUCN Red List of Threatened Species 2016: e.T42394A22162580. Retrieved from: <https://dx.doi.org/10.2305/IUCN.UK.2016-2.RLTS.T42394A22162580.en>
- Godinez, E. & Acosta, M. (1982). Population density of the Florida Duck (*Anas discors* Linne) in a protected area of Cuba. *Poeyana*, Academy of Sciences of Cuba. Number 6. Retrieved from: https://www.researchgate.net/publication/292576206_Densidad_poblacional_del_Pato_de_la_Florida_Anas_discors_Linne_en_un_area_protegida_de_Cuba
- Gongora, J., Reyna-Hurtado, R., Beck, H., Taber, A., Altrichter, M. & Keuroghlian, A. (2011). *Pecari tajacu*. The IUCN Red List of Threatened Species 2011: e.T41777A10562361. Retrieved from: <https://dx.doi.org/10.2305/IUCN.UK.2011-2.RLTS.T41777A10562361.en>
- Guyana Wildlife Conservation and Management Commission. (2021). Declaration of Closed and Open Seasons for Wildlife - Wildlife Conservation. Wildlife Conservation. Retrieved from: <https://wildlife.gov.gy/declaration-of-closed-and-open-seasons-for-wildlife/>
- Guyana Wildlife Conservation and Management Commission. (2021). National Quota Utilization (NQU). Created 6th October, 2021. Retrieved from: https://docs.google.com/spreadsheets/d/1SBp3-n2zAm_db5H_hSYDiaCUyF7ZhjiULXr-VIRxndQ/edit#gid=599826643
- Hallett, M.T. (2018). Monitoring Large Mammals in the Rupununi: Past Efforts and Proposed Approach (Baseline Report) [Doc]. Sustainable Wildlife Management Guyana.
- Haralson, C. (2004). *Mazama gouazoubira* (Online), Animal Diversity Web. Retrieved from: https://animaldiversity.org/accounts/Mazama_gouazoubira/
- Hayssen, V. (2014). *Cabassous unicinctus*. *Mammalian Species*. Vol. 46 (907). Pages 16–23. Retrieved from: <https://doi.org/10.1644/907>
- Hellgren, E. C., & Ruthven, D. C. (2007). Progeny Sex Ratio in a Sexually Monomorphic Ungulate, the Collared Peccary (*Tayassu tajacu*). *Journal*

- of Mammalogy, 88(1), 124–128. Retrieved from: <http://www.jstor.org/stable/4126858>
- Howard, L. (2004). Cracidae (Online), Animal Diversity Web. Retrieved from: <https://animaldiversity.org/accounts/Cracidae/>
- Jones, K. R., & Garcia, G. W. (2023). Anthelmintic usage on the reproductive parameters in captive reared agoutis (*Dasyprocta leporina*) in Trinidad and Tobago, West Indies. *Brazilian Journal of Biology*, 83. <https://doi.org/10.1590/1519-6984.246781>
- Jones, K. R., Lall, K. R., & Garcia, G. W. (2019). Omnivorous behaviour of the agouti (*dasyprocta leporina*): A neotropical rodent with the potential for domestication. *Scientifica*, 2019, 1–5. <https://doi.org/10.1155/2019/3759783>
- Jones, K. R., Lall, K. R., & Garcia, G. W. (2022). Reproductive diseases in captive agoutis (*Dasyprocta leporina*). *Brazilian Journal of Biology*, 82, 1–8. <https://doi.org/10.1590/1519-6984.237869>
- Keuroghlian, A., Desbiez, A., Reyna-Hurtado, R., Altrichter, M., Beck, H., Taber, A. & Fragoso, J.M.V. (2013). *Tayassu pecari*. The IUCN Red List of Threatened Species 2013: e.T41778A44051115. Retrieved from: <https://dx.doi.org/10.2305/IUCN.UK.2013-1.RLTS.T41778A44051115.en>
- Kinahan, A.A, Henry, S., & Husbands, S. (2019). Guyana Wildlife Conservation and Management Commission: Strategic Plan 2019-2029 (PDF). Retrieved from: <https://wildlife.gov.gy/wp-content/uploads/2019/10/GWCMC-Strategic-Plan-2019-2029.pdf>
- Kricher, J. (2006). *Galapagos: A Natural History*. Princeton, New Jersey: Princeton University Press.
- Lacher, T.E., Jr. (2016). Family Caviidae. In: Wilson, D.E., Lacher, T.E., Jr and Mittermeier, R.A. (eds), *Handbook of Mammals of the World. Vol. 6. Lagomorphs and Rodents: Part 1.*, Lynx Editions, Barcelona.
- Loughry, W. J., & McDonough, C. M. (1996). Are road kills valid indicators of armadillo population structure? *The American Midland Naturalist*, 135(1), 53–59. <https://doi.org/10.2307/2426871>
- Loughry, W. J., & McDonough, C. M. (1998). Comparisons between nine-banded armadillo (*Dasypos novemcinctus*) populations in Brazil and the United States. *Revista de Biología Tropical*, 46(4), 1173–1183. <https://doi.org/10.15517/rbt.v46i4.20740>
- Loughry, W. J., Perez-Heydrich, C., McDonough, C. M., & Oli, M. K. (2013a). Population dynamics and range expansion in Nine-Banded armadillos. *PLoS ONE*, 8(7), e68311. <https://doi.org/10.1371/journal.pone.0068311>
- Loughry, W. J., Perez-Heydrich, C., McDonough, C. M., & Oli, M. K. (2013b). Population ecology of the nine-banded armadillo in Florida. *Journal of Mammalogy*, 94(2), 408–416. <https://doi.org/10.1644/12-mamm-a-198.1>
- Maldonado-Chaparro, A., & Blumstein, D. T. (2008). Management implications of capybara (*Hydrochoerus hydrochaeris*) social behavior. *Biological Conservation*, 141(8), 1945–1952. <https://doi.org/10.1016/j.biocon.2008.05.005>

Max-Planck-Gesellschaft. (2002). Longevity Records: Life Spans of Mammals, Birds, Amphibians, Reptiles, and Fish. Demogr.mpg.de. Retrieved from: <https://www.demogr.mpg.de/longevityrecords/0301.htm>

Mayor, P., el Bizri, H., Bodmer, R. E., & Bowler, M. (2017). Assessment of mammal reproduction for hunting sustainability through community-based sampling of species in the wild. *Conservation Biology*, 31(4), 912–923. <https://doi.org/10.1111/cobi.12870>

Mayor, P. G., Bodmer, R. E., & Bejar, M. L. (2010). Reproductive performance of the wild collared peccary (*Tayassu tajacu*) female in the Peruvian Amazon. *European Journal of Wildlife Research*, 56(4), 681–684. <https://doi.org/10.1007/s10344-010-0379-8>

McDonald, K., & Larson, J. (2011). *Dasypus novemcinctus* (Online), Animal Diversity Web. Retrieved from: https://animaldiversity.org/accounts/Dasypus_novemcinctus/

McDonough, C. M., Lockhart, J. M., & Loughry, W. J. (2007). Population dynamics of Nine-Banded armadillos: Insights from a removal experiment. *Southeastern Naturalist*, 6(3), 381–392.

Mengak, M. (2012). Nine-Banded Armadillo (*Dasypus novemcinctus*) [PDF]. The University of Georgia. <https://extension.uga.edu/publications/detail.html?number=C866-2&title=Natural%20History%20Series:%20Nine-Banded%20Armadillo>

Mengak, Michael T. (2004). Ninebanded Armadillo (*Dasypus novemcinctus*). USDA National Wildlife Research Center

- Staff Publications. 959. Retrieved from: https://digitalcommons.unl.edu/icwdm_usdanwrc/959

Mingo, M. (2008). *Anas discors* (Online), Animal Diversity Web. Retrieved from: https://animaldiversity.org/accounts/Anas_discors/

Moore, K. (2002). *Actitis macularius* (Online), Animal Diversity Web. Retrieved from: https://animaldiversity.org/accounts/Actitis_macularius/

Moscarella, R. A., Aguilera, M., & Escalante, A. A. (2003). Phylogeography, population structure, and implications for conservation of white-tailed deer (*Odocoileus virginianus*) in Venezuela. *Journal of Mammalogy*, 84(4), 1300–1315. <https://doi.org/10.1644/brb-028>

Nellis, D. (2001). *Common Coastal Birds of Florida and the Caribbean*. Sarasota, Florida: Pineapple Press Incorporated.

Nowak, R. (2018). *Walker's Mammals of the World* (pp. 591-599). Johns Hopkins University Press. Retrieved from: <https://books.google.gy/>

Paemelaere, E.A.D. (2018). *Wildmeat and Fish: Consumption and Trade in Region 9, Guyana (Baseline Report)* [PDF]. Sustainable Wildlife Management Guyana.

Paemelaere, E.A.D., Puran, A., Zammett, J., Williams, T., & Kenyon, A. (2021). *Wild meat: an integrated report Y1-Y3* [PDF]. Sustainable Wildlife Management Guyana Project.

Parker, T. A., III, Foster, R. B., Emmons, L. H., Freed, P., Forsyth, A. B., Hoffman, B., &

- Gill, B. D. (1993). A biological assessment of the Kanuku mountain region of southwestern Guyana (RAP Working Papers 5 ed.). Conservation International.
- Partners in Flight. (2019). Avian Conservation Assessment Database, version 2019. Retrieved from: <http://pif.birdconservancy.org/ACAD>
- Patton, J.L., Pardiñas, U.F.J. and D'Elía, G. (2015). Mammals of South America, Rodents (Vol. 2) [PDF]. The University of Chicago Press, Chicago and London.
- Reid, F. (2016). *Choerus hydrochaeris*. The IUCN Red List of Threatened Species 2016: e.T10300A22190005. Retrieved from: <https://dx.doi.org/10.2305/IUCN.UK.2016-2.RLTS.T10300A22190005.en>
- Rivera-milan, Frank & Bonilla-Martinez, Gilbert. (2010). Estimation of Abundance and Recommendations for Monitoring White-Cheeked Pintails in Wetlands of Puerto Rico and Territorial Islands. The Journal of Wildlife Management. 71. 861 - 867. Retrieved from: <http://www.jstor.org/stable/4495263>
- San Diego Zoo Wildlife Alliance. (2021, March). Capybaras (*Hydrochoerus* spp.) fact sheet: Reproduction & development. International Environment Library Consortium. <https://ielc.libguides.com/sdzg/factsheets/capybaras/reproduction>
- San Francisco Zoo & Gardens. (2021). White-faced Whistling Duck - San Francisco Zoo & Gardens. Retrieved from: <https://www.sfbzoo.org/white-faced-whistling-duck/>
- Schagene, A. (2010). *Cairina moschata* (Online), Animal Diversity Web. Retrieved from: https://animaldiversity.org/accounts/Cairina_moschata/
- Senner, S. E., B. A. Andres and H. R. Gates. (2016). Pacific Americas shorebird conservation strategy. National Audubon Society, New York, New York, USA. Retrieved from: <http://www.shorebirdplan.org>
- Silva, M., Brown, J., & Downing, J. (1997). Differences in Population Density and Energy Use between Birds and Mammals: A Macroecological Perspective. The Journal of Animal Ecology, 66(3), 327. Retrieved from: <https://doi.org/10.2307/5979>
- Sorenson, L, 1992. Variable mating systems of the sedentary tropical duck: the white-cheeked pintail (*Anas bahamensis*, *bahamensis*). The Auk, 109(2), 277-292. Retrieved from: <https://doi.org/10.2307/4088196>
- Sowls, L.K. (1984). The Peccaries. The University of Arizona Press, Tuscon, Arizona, USA.
- Stabroek News. (2011). Red-rumped Agouti. Retrieved from: <https://www.stabroeknews.com/2011/08/28/features/red-rumped-agouti/>
- Stabroek News. (2012). White-tailed Deer. Stabroek News. Retrieved from: <https://www.stabroeknews.com/2012/09/16/sunday/in-the-rainforest/white-tailed-deer/>
- Stephen, C. (2019). Open and Closed Season [Doc]. Guyana Wildlife Conservation and Management Commission – Research Division 2019. Pages 1-11.

Stephen, C. (2021). Consideration of Open and Closed Season for selected species [Doc]. Guyana Wildlife Conservation and Management Commission – Research Division 2021. Pages 1-20.

Things Guyana. (2021). Meet The Blue winged teal That's Found In Guyana. Retrieved from: <https://www.thingsguyana.com/meet-the-blue-winged-teal-thats-found-in-guyana/>

van Vliet, N., & Nasi, R. (2018). What do we know about the life-history traits of widely hunted tropical mammals? *Oryx*, 53(4), 670–676. <https://doi.org/10.1017/s0030605317001545>

Verme, L. J. (1983). Sex ratio variation in *Odocoileus*: A critical review. *The Journal of Wildlife Management*, 47(3), 573–582. <https://doi.org/10.2307/3808595>

Verme, L., & Ozoga, J. (1981). Sex Ratio of White-Tailed Deer and the Estrus Cycle. *The Journal of Wildlife Management*, 45(3), 710. Retrieved from: <https://doi.org/10.2307/3808704>

Walcott, C. (2021). Open and Closed Season based on consultations with stakeholders (Exporters, Middlemen, Trappers and South Rupununi Conservation Society) [Doc]. Guyana Wildlife Conservation and Management Commission.

Wilson, D.E., Lacher, T.E., Jr., Mittermeier, R.A. (2016). Family Caviidae. Lagomorphs and Rodents I. *Handbook of Mammals of the World*. Vol. 6. Lynx Editions, Barcelona.

WWF-Guianas & Global Wildlife Conservation. (2016). Biodiversity of the southern rupununi savannah.





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