



TECHNICAL PAPER SERIES

Strengthening a sustainable management initiative and traceability mechanisms for Psittacines in Guyana

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Abstract: During January to July 2021, field populations of Psittacines distributed across known trapping sites in Guyana were assessed for abundance and distribution, public consultations with key stakeholders on psittacine management planning and pet management were held and a psittacine pet registration module (PPRM) was developed, all to strengthen the sustainable management and traceability mechanism for psittacines in Guyana. *Amazonica amazonica* had the highest relative abundance across all ecological zones (0.311) followed by *Pionus menstruus* (0.238) and *P. melanocephalus* (0.096). No other species had a relative abundance greater than 0.07. Psittacine species richness of the ecological zones ranged from 6 to 11 however, the zones had similar species diversity of psittacines as measured using the Shannon Diversity Index. Approximately 30% of the species observed were found at all ecological zones. For prudent management the trade of these species may continue at the current rate provided that offtake and natural populations are carefully monitored. The Psittacine Management Plan should provide for the establishment of annual monitoring of all psittacine species in the trade utilizing distance sampling methods and the involvement of local communities. Trappers, traders and owners of psittacine pets have access to information on the care and management of the birds in captivity and the registration of pets using an online PPRM, that is a part of the Domestic Licence Management System for wildlife in Guyana.

Keywords: assessment, administrative regions, macaws, management planning, parrots, pets, registration.

Background

Guyana is considered the country with the largest number of exports for psittacines, collectively referred to as parrots, in the Amazon; approximately 139,485 parrots left the country over the period 2000-2013 (ORTIZ-VON HALLE, 2018). The exportation of parrots from Guyana began in the 1970s (KRATTER, 1998), and national quotas for 2020 for the various species can be found

[here](#). Psittacines have been harvested for a variety of uses in Guyana over the years. These species are quite charismatic and are very popular in the pet trade. The pet trade is the primary catalyst for the observed harvesting in the country, as there is high demand, by foreigners and locals, for these animals.

As the national focal point for the Convention on International Trade in Endangered Species of Wild Fauna and Flora (CITES),



the Guyana Wildlife Conservation and Management Commission (GWCMC), has an obligation to conduct assessments to inform the non-detriment findings outlined in the convention. The first recorded assessment of psittacines was conducted during the late 1990s (KRATTER, 1998), and the second, during the period 2018-2019, in known trapping areas across Guyana (GWCMC, 2020). With the financial support from the Amazon Cooperation Treaty Organization (ACTO), through the KfW-funded Bioamazon Project (Component 3)¹, the GWCMC is strengthening a sustainable management initiative and traceability mechanisms for Amazonian species in Guyana. This present assessment was carried out from January to July 2021 and contributes to management planning for the sustainable utilization, conservation and (where possible) protection of psittacines in Guyana.

General objective

To improve management initiatives for all psittacines utilized in the domestic and international trade to ensure that viable populations remain throughout their historic range.

Specific objectives

- To collect information on the abundance and distribution of psittacines from selected areas in Guyana.

- To develop specific management strategies, through consultations with stakeholders, and to contribute to the overall management plan for psittacines in Guyana.
- To develop, market and execute a system to encourage citizens who are owners of psittacines to register their pet with the Bioamazon National Technical Focal Point.
- To develop and produce an informational user's guide on best practices for trapping, transporting and caring for psittacines in the international and domestic trade.

Population assessment based on field surveys

From February to June 2021, a series of surveys of populations of psittacines were conducted in Administrative Regions #2, #4, #7, #8, #9 and #10. These sites were located in a range of habitats with specific sampling sites identified by local experts. Study areas were determined as important for psittacines based on knowledge gained from preliminary studies.

Methodology: Two distance sampling methods, line transect and point transect (BUCKLAND et al, 1993), were used to study the populations of psittacine species. Data from field surveys, collected during a total of 25 survey events - eight line transects and 17 point transects - at 22 sites, were recorded.

¹ Bioamazon Project Component 3: "Strengthening sustainable management initiatives and traceability mechanisms for Amazonian species" seeks to prioritize and strengthen existing initiatives for the

sustainable management of species through investments requested by ACTO member countries, among the most relevant, those that allow better evaluation of traceability systems.



Ten of the 13 sites included in the analysis were only sampled once for one hour. The remaining three were sampled at least twice for one to two hours on the same day. The data therefore is largely representative of events (an occurrence of short duration at a specific moment in time) rather than a reliable sample of the population. Results and inferences therefore need to be viewed and tempered with this caveat in mind. After

an assessment of the data quality, considering completeness and execution of the methods, data from 16 surveys - two line transects and 14 point transects - from 13 sites were selected for analysis. Survey sites were plotted on satellite imagery to illustrate spatial distribution using Google Earth Pro. Based on the geographical distribution, the sites were grouped into ecological zones identified, and summarized in Table 1 below.

Table 1: Determined ecological zones with associated sample sites for Psittacines in Guyana, 2021.

| Ecological Zones | Sample Sites |
|-------------------|--|
| Iwokrama-Rupununi | Site 17 |
| Mabura | Site 5, Site 6, Site 7, Site 9, Site 11, Site 12 and Site 13 |
| Pomeroon-Supenaam | Site 14, Site 15 and Site 16 |
| Rockstone-Macuria | Site 1, Site 2, Site 3, Site 4 and Site 10 |
| Soesdyke-Linden | Site 8, Site 18, Site 19, Site 20, Site 21 and Site 22 |

Psittacine population data were analyzed similarly at the level of the ecological zones and individual survey sites. The area of a point transect was computed as the area of a circle with radius equals the maximum observable distance of 150m. The area of a line transect was calculated as the area of a rectangle with length equal to the length of the transect and width equal to twice the maximum observable distance of 150m. Species diversity was estimated using the

Shannon Diversity Index (H). The relative abundances of each species observed were computed by dividing the observed abundance for the species by the total abundance for the transect/site/zone. The population density of each species was computed simply by dividing the observed abundance of each species by the sample area (site/zone). This is a simplification of the density formula presented by Buckland and colleagues (1993) to estimate the actual



probability of detection. The computation of species densities within the ecological zones was done for line transects and point transects together and separately (LEGAULT et al, 2012). All data were aggregated to compute the total number of observations, overall species richness and relative abundances. Computed densities and species diversity were also compared across zones. Analyses were conducted in MicroSoft Excel and R.

Results: Across all zones, 261 individual observations were made and the observed abundance of psittacines was 1,574, a number that was reduced to 998 after treatment of the data for the Soesdyke-Linden zone (Table 2). Species richness

across all zones was 14. Relative abundance is illustrated in Figure 1. *A. amazonica* had the highest relative abundance across all zones (0.311) followed by *P. menstruus* (0.238) and *P. melanocephalus* (0.096). No other species had a relative abundance greater than 0.07.

Four species were found in all zones surveyed - *A. amazonica*, *A. farinosa*, *P. melanocephalus* and *P. menstruus*. Another five species were observed only in one zone - *A. dufresniana*, *A. ararauna*, *Aratiga pertinax* (Brown-Throated Parakeet), *F. passerinus* and *P. caica*. Of these five species, three were only found in the Mabura ecological zone and two were only found in the Soesdyke-Linden ecological zone.

Table 2: Overall species richness, observed species abundance and relative abundance for all zones combined.

| Scientific Names (Common Names) | Observed Abundance | Relative abundance |
|---|--------------------|--------------------|
| <i>Amazona amazonica</i> (Orange-winged amazon) | 310 | 0.311 |
| <i>Amazona dufresniana</i> (Blue-cheeked amazon) | 10 | 0.01 |
| <i>Amazona farinosa</i> (Mealy Parrot) | 53 | 0.053 |
| <i>Ara ararauna</i> (Blue and Gold Macaw) | 1 | 0.001 |
| <i>Ara chloropterus</i> (Red and Green Macaw) | 34 | 0.034 |
| <i>Aratiga pertinax</i> (Brown-Throated Parakeet) | 21 | 0.021 |
| <i>Derophtus accipitrinus</i> (Red-fan Parrot) | 16 | 0.016 |
| <i>Diopsittaca nobilis</i> (Red-Shouldered Macaw) | 40 | 0.04 |



| | | |
|--|-----|-------|
| <i>Forpus passerinus</i> (Green-Rumped Parrotlet) | 68 | 0.068 |
| <i>Orthopsittaca manilata</i> (Red-bellied Macaw) | 52 | 0.052 |
| <i>Pionites melanocephalus</i> (Black-Headed Parrot) | 96 | 0.096 |
| <i>Pionus fuscus</i> (Dusky Parrot) | 36 | 0.036 |
| <i>Pionus menstruus</i> (Blue-Headed Parrot) | 238 | 0.238 |
| <i>Pyrilia caica</i> (Caica Parrot) | 23 | 0.023 |
| Total | 998 | |
| Species Richness | 14 | |

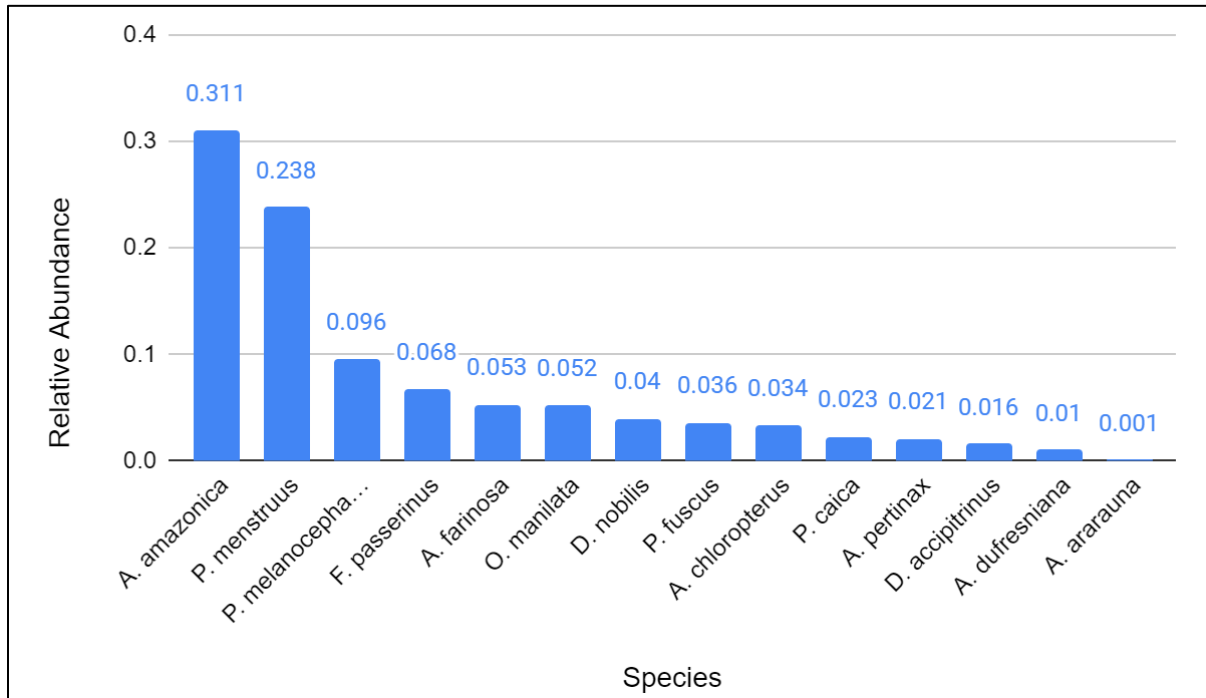


Figure 1: Relative abundance based on combined abundance at all zones for species observed in study.



Figure 2 and Table 3 summarizes the estimated density for each species in the ecological zones. Only point transect data are used here so as to avoid the impact of data from line transects previously mentioned. The Coefficient of Variation

indicates that the variation of densities among the zones for only three species (*A. amazonica*, *A. farinosa* and *D. accipitrinus*) was high (>1).

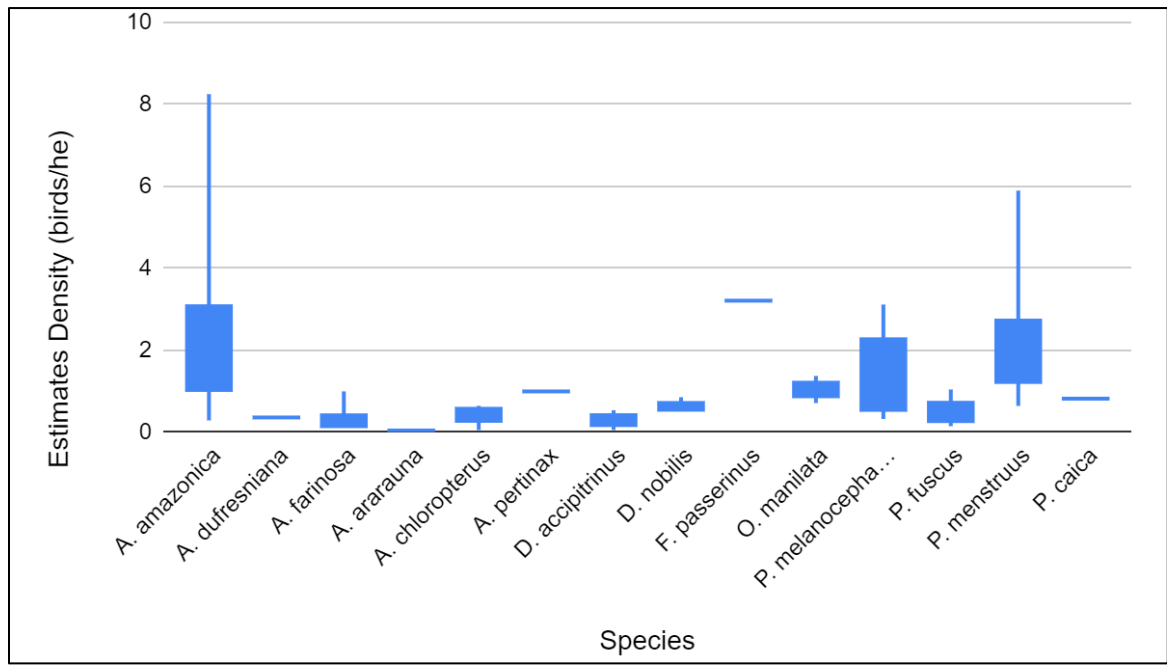


Figure 2: Boxplot of estimated population density for species observed at all zones.

Table 3: Summary of estimated population densities for each species at all zones with coefficient of variation among the zones for each specie.

| Scientific Names (Common Names) | Population density at zones (point transects only) | | | | Coefficient of variation (CV) |
|------------------------------------|--|-----------------|-------------------|---------|-------------------------------|
| | Pomeroon-Supenaam | Soesdyke-Linden | Rockstone-Macuria | Mabur a | |
| <i>Amazona amazonica</i> | 1.273 | 8.252 | 0.283 | 1.344 | 1.3 |



| | | | | | |
|--------------------------------|-------|-------|-------|-------|-----|
| <i>Amazona dufresniana</i> | | | | 0.354 | 0.0 |
| <i>Amazona farinosa</i> | 0.141 | 0.141 | 0.99 | 0.212 | 1.1 |
| <i>Ara ararauna</i> | | | | 0.035 | 0.0 |
| <i>Ara chloropterus</i> | | 0.047 | 0.637 | 0.495 | 0.8 |
| <i>Aratiga pertinax</i> | | 0.99 | | | 0.0 |
| <i>Deropterus accipitrinus</i> | | 0.047 | | 0.531 | 1.2 |
| <i>Diopsittaca nobilis</i> | 0.849 | 0.519 | | 0.566 | 0.3 |
| <i>Forpus passerinus</i> | | 3.207 | | | 0.0 |
| <i>Orthopsittaca manilata</i> | 0.707 | 1.368 | | | 0.5 |
| <i>Pionites melanocephalus</i> | 3.112 | 0.613 | 1.981 | 0.318 | 0.9 |
| <i>Pionus fuscus</i> | | 1.037 | 0.141 | 0.389 | 0.9 |
| <i>Pionus menstruus</i> | 1.415 | 5.895 | 0.637 | 1.662 | 1.0 |
| <i>Pyrrhuloxia caica</i> | | | | 0.813 | 0.0 |

| Ecological Zones | Shannon Diversity Index (H) |
|-------------------|-----------------------------|
| Pomeroon-Supenaam | 1.53 |
| Soesdyke-Linden | 1.7 |
| Rockstone-Macuria | 1.59 |
| Mabura | 2.13 |
| | CV = 0.2 |



All ecological zones had Shannon Diversity Indices for psittacines ranging from 1.53 to

2.13 with low variation among them (CV=0.2)

Main inferences:

1. The study covered a good set of ecologically distinguishable areas, critical for the capture of parrots and macaws for the trade.
2. This study can be used as a baseline for monitoring populations of psittacines in Guyana at regular intervals.
3. There are 28 species of psittacines known from Guyana (MELINSKY *et al*, 2005) and 19 of these species are listed for trade from Guyana. These surveys encountered 14 species of which 13 are listed for trade.
4. The study provides a significantly empirical basis to guide the future extraction of Psittacine species from the wild and continued monitoring of the populations. Cross referencing the findings of this study with published records of densities of a number of genera and species - *Amazona*, *Ara*, *Aratinga* and *Pionus* (MARSDEN & ROYLE, 2015), *A. amazonica* (MARSDEN *et al*, 2000), *A. farinosa* (LEE & MARSDEN, 2012; Guix *et al*, 1999), *A. chloropterus* (LEE & MARSDEN, 2012), *O. manilata* (LEE & MARSDEN, 2012) and *P. menstruus* (LEE & MARSDEN, 2012; MARSDEN *et al*, 2000) - suggests that the densities observed are similar to or above what is those observed in similar ecosystems.
5. Psittacine species richness of the ecological zones ranged from 6 to 11 however, the zones had similar species diversity of psittacines as measured using the Shannon Diversity Index. Approximately 30% of the species observed were found at all ecological zones and approximately 35% were found at only one zone. All species could be found between Soesdyke-Linden and Mabura and these two zones were also the most species rich, diverse and unique in relation to psittacines.
6. The ecological zones need to be better defined and geographical boundaries established to allow for the estimation of population sizes in the future.
7. In order to ensure all species in the trade are included in any future population assessments, additional ecological zones must be surveyed. Three areas are recommended - the Barima and Waini river basins in the north-west region, the middle and upper Mazaruni districts and the Rupununi savannahs and associated mountains (Kanuku and Acarai).

Public consultation on key considerations for Psittacine management planning

To gather information from stakeholders who utilize psittacines, in-person workshops were held over a period of four months, and facilitated by GWCMC, supported by an



independent consultant. Workshops were held in eight administrative regions, as follows: Region 1 (Mabaruma), Region 2 (Lake Mainstay), Region 4 (East Bank Demerara / Soesdyke, Georgetown), Region 6 (Corentyne), Region 7 (Bartica, Kamarang), Region 8 (Mahdia), Region 9 (Lethem), and Region 10 (Linden). Through the planning process and stakeholder analysis, the following groups were selected for engagement: - Toshaos (village captains), trappers, middlemen, transporters of wildlife, residents of indigenous communities, institutional stakeholders and persons living in or proximal to areas identified as critical habitats for psittacines.

Recommendations for Psittacines management planning

1. There is no evidence to suggest that any species encountered in the surveys should be removed from the trade. However, there is also no evidence to justify an increase in trade in any of these species. For prudent management the trade of these species may continue at the current rate provided that offtake and natural populations are carefully monitored.
2. The Psittacine Management Plan should provide for the establishment of annual monitoring of all psittacine species in the trade utilizing distance sampling methods.
3. Other critical areas for psittacines in Guyana need to be included in the monitoring of populations of these species in order to: (a) monitor the full

range of psittacine species (with priority on those in the trade); (b) monitor areas with no or extremely low harvesting pressures to understand trends in psittacine populations independent of harvesting pressures. Four areas for consideration in this regard are: (i) North Rupununi savannahs and Iwokrama forest; (ii) South Rupununi savannahs and Kanuku and Acarai mountains; (iii) Middle and upper Mazaruni districts; and, (iv) Barima-Waini region.

4. The Management Plan should establish or cater for the establishment of boundaries for all psittacine ecological zones to allow for estimating population sizes from population density data. These Zones may wholly or partially be designated as harvesting or non-harvesting areas. Based on high species richness and diversity, and indications of high population densities, The Soesdyke-Linden and Mabura zones determined in the referenced study may be designated as harvesting zones.
5. The Plan should require the establishment of non-harvesting areas to cover all species in the trade. These areas will serve as sanctuaries where populations of harvested species can thrive without harvesting pressure. They will provide genetic material to other populations and will also serve as reference populations to study the impact of harvesting. The



Upper-Mazaruni is one possible non-harvesting area.

6. The management plan for psittacines should allow for the provision of incentives to communities for protection and preservation of habitats and species. These may include financial support for protection/preservation and providing evidence of the same, support for alternative livelihoods, direct benefits from law enforcement and capacity building opportunities. Specific incentives should be discussed with individual communities and formalized in agreements.
7. Related to 6 above, villages will need to be assisted with the development of community regulations for the management of psittacines and their habitats.
8. Monitoring is critical to management and the psittacine management plan should cater for monitoring of populations and habitats in areas designated for harvesting as well as non-harvesting areas. Monitoring extraction, housing and transport of the species for compliance should be routine. This may be accomplished through local community engagement and/or inter-agency collaboration.
9. Before the management plan is finalized for implementation stakeholder groups should be engaged in an effective way on its content and provisions and

particularly how it relates to them, there should be capacity building opportunities at the community level that would aid the conservation of the species, and approaches to encourage the presence of species should be explored by the GWCMC and the relevant agencies.

Registration of psittacines as pets

The GWCMC is currently undertaking the development of a digital system for licensing the domestic wildlife trade, called the Domestic Licence Management System (DLMS). The GWCMC developed an online Psittacine Pet Registration Module (PPRM) as part of the DLMS. Owners of pets can simply log in and input data and information in the online registration form. In addition, a strategy was developed to increase awareness among the owners of Psittacines' pet about the requirement for registration with the GWCMC.

The DLMS consist of three applications;

- a) Licence Admin Portal (LAP),
- b) Wildlife Application Portal (WAP) and
- c) Licence Management System API (LMSAPI);

The PPRM uses a subset of each. The PPRM focuses on the registration of psittacine as pets and the analysis and export of the registration data. The capabilities of the PPRM are as follows:

- Psittacine Species Management - Using the LAP, staff of the GWCMC can create, view, update, and delete the list of known psittacine species.



- This list is presented to the pet owner during the pet registration process.
- Data Analysis - Using the LAP, staff of the GWCMC can view a dashboard summarizing pet registration by administrative region, species and a combination of both. The feature also supports region and species filters for applicable charts.
 - Data Export - All pet registrations can be exported to a formatted Microsoft Excel file for further data analysis and record keeping.
 - Pet Registration - Using the WAP, pet owners can register their pets using a website.

In collaboration with the Bioamazon National Technical Focal Point, a temporary link is in use for the online registration <https://application.gwcmc.geoideasgy.com/#/>, but that once the licensing system has been finalized, the online registration application will be migrated to the GWCMC website by GWCMC staff.

The Psittacine pet registration awareness strategy will utilize a combination of digital and printed materials, audio-visual content, stakeholder engagements and an active online presence via website and social media to reach the specified target audience; thereby ensuring that the message is

delivered and received by the intended target group, the required action is taken and ultimately the expected outcome is achieved. Monitoring Indicators have been developed to track how citizens, who are owners of psittacines, register their pet with the National Technical Focal Point.

Parrot care

The GWCMC has developed a booklet to: (i) offer advice on trapping and handling birds; (ii) to provide first aid to birds in the care of pet owners; and (iii) to improve ways birds are handled to decrease death during transport (Figure 3). The overall goal is to safeguard parrots and macaws in the local and international trade by improving how these birds are handled during harvesting and transport to holding stations.

Trapping is the first physical stage in the wildlife trade and is done throughout Guyana. Trapping parrots and macaws provides an income with minimal investment but can result in unnecessary death of birds if not practised correctly. Animal welfare concerns remain a priority for the GWCMC and therefore this guide on best practices was developed after an assessment was done to determine the factors which may lead to death of birds during trapping.



Figure 3: Informational guide for improved handling and care of psittacines in Guyana (GWCMC 2021).



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