

## Hunting and wildlife management in French Guiana :

### Current aspects and future prospects

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French Guiana is a French overseas department, located between Brazil and Surinam. Human density is very low, averaging less than two people/km<sup>2</sup>. However, the population is not evenly distributed, and most people are concentrated in the coastal area. Ninety-five percent of the territory is covered by evergreen tropical moist forest representing over 8 million ha of almost intact and non-fragmented forest. Many different ethnic groups are present: Creoles, Bushi-nengue, Hmongs, Chinese, people coming from metropolitan France, and six different Amerindian groups (Wayãpi, Wayana, Teko, Kali'na, Palikur, Arawak) share the country. For most of the people, except perhaps the Chinese who are mainly involved in restaurants and food-shops, hunting is both a strong old local tradition and still a present current practice. Subsistence hunters are frequent in remote isolated areas. In small rural villages, and for people with low income, despite government aids, hunting for meat and selling the surplus represent a non-negligible contribution. More or less organized commercial hunting also exists as well as sport hunting near the main cities.

Since about ten years ago, the ministry of Environment took a new interest in French Guianan conservation problems. A project of National park was initiated, following the Rio's conference recommendations, and in 1993 the National Game and Wildlife Service (Office National de la Chasse et de la Faune Sauvage: ONCFS) began to work for the first time in the country. ONCFS' roles concern the knowledge of wildlife and its habitats, and of hunting. In the whole France, these governmental agents are in charge of environmental police, in particular hunting control, and realize applied studies on wildlife management.

In 1999 national funds were proposed for research projects about "impacts on the environment in tropical areas". The scientific group "Silvolab", grouping ten scientific and management National organizations working on tropical forest topics, engaged a two-years program named "Hunting in French Guiana: towards sustainable management". The main objective of this program, based on a multi-disciplinary approach, is to set the necessary scientific, ecological and sociological bases for the development of a sustainable use of French Guianan wildlife. First results are not published yet, but new and complementary studies were already set and are currently running.

The present paper aims at presenting the situation in year 2002 in French Guiana, which is not well known in neighboring neotropical countries, and then the current status and orientations of the wildlife management researches.

## **Present hunting laws in French Guiana**

Although French Guiana is a French department, the French hunting law does not apply. The general French hunting law specifies that the decrees apply throughout the whole French territory, (including the French West Indies, for example), except French Guiana. No specific reason was given, but one can imagine that the situation was so far, complex and different from metropolitan France, that at that time the problem was purely avoided.

As a consequence, in French Guiana there is at the present time no hunting season nor requirement for a hunting license, everyone can hunt anytime anywhere, except in protected areas, and there are very few restrictions to hunting. A general review of the hunting regulations in the various Amazonian countries (Richard-Hansen, 1998) has shown that French Guiana has one of the mildest restrictions on hunting practices.

A first regulation on hunting was set in 1975, but as a local decree has relatively weak enforcement power. Later, in 1986, ministerial decrees enacted basic rules for wildlife protection, completed in 1991 and 1995 for marine turtles, cetaceans and sirenians. In 1995, another decree gave a more precise statement about the local trade.

At the present time, there are in French Guiana 3 main categories for wildlife: fully protected species (Annex 1), for which any use is forbidden, species for which hunting is allowed but no trade can be done, and the third one for which both hunting and local trade are allowed.

Eight species of mammals can be traded locally: i.e. the two species of peccaries (*Tayassu tajacu* and *Tayassu pecari*), the tapir *Tapirus terrestris*, 3 species of rodents : paca (*Agouti paca*), red-rumped agouti (*Dasyprocta agouti*) and capibara (*Hydrochaeris hydrochaeris*), and two armadillos (*Dasypus novemcinctus* and *Dasypus kappleri*). Anyone concerned with conservation and sustainable use will certainly notice that trading tapir meat can hardly be justified from a biological point of view. It is much more likely that because of its importance for local people, political reasons might at this time have weighed heavily in these decisions.

The same problem appears for birds, since the black curassow (*Crax alector*), trumpet birds (*Psophia crepitans*) and guans (*Penelope marail*) are the three species that can be traded locally, owing to a strong hunting tradition, and although they may be among the most vulnerable to hunting pressure. For the Reptile class, the green iguana (*Iguana iguana*) is the only species authorized to commerce.

Concerning international trade, France is a party of CITES and 21 species of French Guiana are listed in Annex I, and 170 in Annex II (Source : website CITES). Moreover, most of the French Guianan fauna is forbidden to export, even to metropolitan France.

## **Bush meat trade**

The bush meat trade has been monitored for several years by the local agency of the Veterinary Services, a government service, at the Cayenne Market, central place for the local food trade. Estimations of tons of meat sold at this place between 1986 and 1997 are presented Figure 1 (adapted from Tyburn, 1994). Generally speaking, tapir and peccaries represent the major part of the traded biomass. In 1986 the effect of the new regulation, declaring the brockett deer (*Mazama sp.*) illegal to trade, is clear. For smaller species results are also presented as numbers of pieces sold (Fig. 2).

The general tendency clearly shows a decrease in the global amount of meat sold at this place. However, after 1995, this monitoring was made less systematically than before (indicated by the dashed line on the graph). Actually, the presence of bush meat dealers on the market place has become less and less frequent and regular, and the controls are more difficult. In fact, although we assume that a decrease of total amount of bush meat traded certainly exists, this result is also related to the emergence of new commercial channels (Magnat, 2000; pers. Obs.). Hunters and dealers are more and more often selling their meat directly to restaurant owners, or even to individual people, and less often at the market. This situation makes the controls by various police services much more difficult. Restaurant owners have to declare their bush meat purchases on specific register, but this is not very well respected, and, moreover, difficult to control.

### **Implementation**

The controls and police surveillance were very rare before 1993, because no specialized service was present. Since 1993, French Game and Wildlife rangers (ONCFS) are present in French Guiana, but still in very small number.

To face up to this situation, their main mean of action was to enhance collaborations with other police services, which have the ability to control but were not interested enough nor informed about wildlife. Rangers of the French game and wildlife service regularly train customs and various policemen to particular aspects of wildlife conservation. Most of the time controls are then made in co-operation.

A specific action has been undertaken for the control of restaurants. It is assumed that the sales of bush meat to restaurants in the main cities may be the most important source of harvest, and risk of overexploitation. Moreover, it is easier and more efficient to control than patrolling wide forest areas. According to the 1995 decree, restaurants that want to sell bush meat have to ask for an authorization, should respect the allowed species only, and fill in a register indicating all traded pieces. A first step was a large information campaign, and then regular controls were made. Monitoring quantities is difficult because the registers are not always very well filled in, but flash-controls allows to detect the presence of illegal species in the freezers. In the main cities of Cayenne and Kourou the situation has greatly changed (*pers. obs.*). It now becomes harder to find illegal species like caiman or brockett deer on the menu, although this was very frequent a few years ago, when almost all wildlife could be eaten in restaurants.

Hunting is also controlled in protected areas, but the isolated situation and the weakness of the number of agents makes it difficult. Thereafter, priorities were set on coastal areas and on sensitive species as marine turtles nesting on the beaches. The first National Reserve was created in 1992. At present time, five National Reserves exist: a marine one, for nesting seabirds as terns and magnificent frigatebirds, two in the interior, non-fragmented forested zone, and two in coastal areas, concerning marshes, wet habitat and sea turtles. In the forest reserves, uninhabited, hunting is strictly forbidden, but coastal reserves of "Kaw marshes" and "Amana" have several different areas, where hunting or fishing may be forbidden, restricted or allowed, for resident and not resident people. Those areas are regularly patrolled by local workers, and additionally more or less frequently by national rangers.

In the rest of the country, hunting controls concern checking for protected species or illegal trade. As the country is wide and very few ways of communication exist, most

controls are made along the roads and rivers. However, the situation remains almost uncontrolled in small and remote villages.

### **Public information**

As enforcement actions are relatively recent, it was in the first place important to inform people of the existing regulations, because many bad habits had been acquired. Various actions were made to inform local people, tourists and residents. The law texts were translated and explained, brochures, a book (Hansen & Richard-Hansen, 2000), booklets and posters were edited, presenting the threats to wildlife, the species protected and allowed for trade.

### **Scientific Studies**

#### *Context and objectives*

Applied studies on wildlife management are a very recent concern, and various study programs on hunting have been launched for few years only. However, detailed studies have previously been conducted on hunting practices of Wayãpi, an Amerindian community living in the South of the region (Grenand, 1996; Ouhoud-Renoux, 1998).

A global review of studies about hunting practices and impacts, ecological knowledge of main game species, sustainable use models, and hunting legislation in Amazonian countries was initially made (Richard-Hansen, 1998; Richard-Hansen & Hansen, 1998). The aim was to assess existing knowledge, in order to orient the studies in French Guiana, by taking into account and adapting previous experiments in neighboring countries.

Since year 2000, study programs on hunting management are running. The coordination unit "Silvolab" was in charge of the first part, involving several scientific institutions<sup>1</sup>, and ONCFS and "Mission pour la création du Parc" now undertake following complementary studies.

The context, or initial situation is to consider both the importance of local hunting tradition and the modern changes in demography and hunting habits, that induce a growing impact on wildlife populations, particularly in the coastal area, which is the most inhabited one. In fact, although local hunters are frightened by the possibility of new hunting regulations, more and more of them agree with the necessity to control the excesses, because they feel that it becomes difficult to hunt in proximate areas. However, they ask for "locally adapted" regulations, taking into account social and faunal particularities of the country.

The program is based on a bifocal approach combining biological and socio-ethnological studies.

In the long term, the ecological part of the program mainly aims at :

- Enhancing basic biological and ecological knowledge on the main hunted species: population structure and dynamics, reproductive rates and periods, relative species abundance in hunted and nonhunted areas, diet and habitat use...
- Developing and perfecting simple ecological and hunting indices which allow to monitor the status of populations and hunting impacts: (Kilometric index of abundance, fecundity and productivity index for females, harvest yields)

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<sup>1</sup> (ONCFS, ONF, IRD, CIRAD, CNRS, ENS, ENGREF, Mission pour la Création du Parc)

On the other hand, a socio-ethnological study was conducted on hunting practices.

First step of this part of the study consisted in :

- Characterizing hunting practices quantitatively and qualitatively: quantifying harvests, analyzing social and ethnic context of hunting, as well as the traditional representation and value of natural environment for the various communities.
- Mapping hunting areas

### ***Methods***

Those studies are developed on some focal study sites on which both approaches are conducted. Some nonhunted sites are complementarily prospected as “reference areas” for estimations of animal densities. The map fig 3 presents the spatial distribution of main places where the study is conducted, or planned to be.

On main study sites, a survey is made with hunters who accept to collaborate. Local investigators visit daily the sample of hunters and record the place, locality, modalities and quantity of harvest. Game harvest data obtained by hunter interviews provides the basic information needed about the global amount of animals harvested, their specific distribution, the age-sex structure of the harvested population, as well as reproductive parameters of the main species and estimation of the hunting territory for each study site. Collecting jaws from hunted animals is undertaken on some study sites, to analyze more finely age structure and survival.

Game densities and abundance are estimated on the hunted areas previously determined by the survey, using standardized line-transect and distance sampling method. The same method is also conducted on various nonhunted sites, used as reference sites for the analyses of sustainability of hunting.

Comparing animal densities in the different nonhunted areas is also interesting to document and understand the ecological influences on animal densities outside human influence. Although there are no strong ecological differences as existing between *varzea* and *terra firme* forests in French Guiana, the carrying capacity may vary according to different animal species and forest types. Hunting impact cannot be clearly assessed if the basic ecological influence on animal densities is not previously known. For that reason, habitat composition and description will be described in each site where animal counts are made.

The study is running in most of the coastal area sites. In the southern area, a project of park is covering a very wide and almost empty area, only inhabited by a few indigenous populations. Five study sites are selected in this area, which will allow to compare different socio-cultural situations, integrating true situations of subsistence hunting. Contrarily to the coastal situation, the small size and isolated situation of some villages will allow to make a preliminary diagnostic of the sustainability of practices, applying models elaborated in other Amazonian places (Robinson & Redford, 1991; Bodmer *et al.*, 1997 a,b). Sustainability of the current hunting practices will be estimated through the analysis of both the harvest quantities and the estimated production of various species on the hunted area (respectively number of animals killed and number of births per square kilometer). The production will as much as possible be estimated locally, according to the reproductive parameters deducted from animals killed in the area. Then the Robinson and Redford (1991) model will be used to set a maximum sustainable harvest level, according to the lifespan of the species (20%, 40%

or 60% of the production as maximum sustainable use, for long-, short- or very short-lived species respectively).

The genetic structure of populations is also studied (CNRS) through the collection of biopsies from the hunted animals, in order to analyze the genetic variability at local and regional scales. Concepts of metapopulation and source-sink systems may be underlying hypothesis with strong conservation implications for wildlife management.

Finally, specific studies on the eco-ethology of the main game species will then be initiated, to conduct true management based on ecological local knowledge.

### **Practical management objectives**

In the project of park, such analysis will be the basis for a proposal of community management of wildlife resources. In the coastal area, the situation is much more complex, because several communities and hunter categories are sharing all places and resources. This makes it very difficult to give people a sense of responsibility for the need of some management, because there is no "appropriation" of the resource and its future.

However, we hope that the results of the study will help to integrate local needs, constraints and realities in the future management rules. French Guiana has the opportunity to convert his "backwardness" in the wildlife management topic in a favorable way, integrating as a practical outcome, and at a large scale, all the discussions, meetings and modelling that Bodmer, Robinson and co-workers have stimulated, without the constraints of a rigid legal or protected area system already in place.

### **Acknowledgements**

Institutions collaborating in the program : SILVOLAB : Global coordination; ONCFS : Abundance index, ecological analysis of harvest impact, wildlife monitoring, Controls; IRD : Sociological and ethnological analysis, scientific coordination; CNRS : Genetic analysis; CIRAD : Bush meat trade ; ONF : Hunting survey and abundance index; ENS : Abundance of game and non-game species of birds ; Mission pour la création du Parc de la Guyane : hunting and ecological studies in the southern area.

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**Annex :**  
**Fully protected animals in French Guiana**

**Mammals**

*Chironectes minimus*  
*Cyclopes didactylus*  
*Tamandua tetradactyla*  
*Myrmecophaga tridactyla*  
*Priodontes maximus*  
*Lutra enudris*  
*Pteronura brasiliensis*  
*Eira barbara*  
*Galictis vittata*  
*Speothos venaticus*  
*Cerdocyon thous*  
*Procyon cancrivorus*  
*Herpailurus yagouaroundi*  
*Trichechus manatus*  
*Ateles paniscus*  
*Chiropotes satanas*  
*Pithecia pithecia*  
*Aotus trivirgatus*  
*Odocoileus virginianus*  
*Leopardus pardalis*  
*Leopardus tigrinus*  
*Leopardus wiedii*

Marine mammals : all sp.

**Birds**

*Anhinga anhinga*  
*Phalacrocorax olivaceus*  
*Pelecanus occidentalis*  
*Fregata magnificens*  
*Phoenicopterus ruber*  
*Cairina moschata*

Ciconiids: all sp.

*Mesembrinis cayanensis*  
*Eudocimus ruber*  
*Ajaia ajaja*

Ardeidae: all sp

Falconiform: all sp

Strigiform: all sp

Lariform: all sp

*Opisthocomus hoazin*  
*Aburira pipile*  
*Ara ararauna*  
*Ara macao*  
*Ara chloroptère*

*Rupicola rupicola*

**Reptiles**

*Melanosuchus niger*  
*Chelus fimbriatus*  
*Platemys platycephala*  
*Podocnemis cayanensis*  
*Corallus caninus*  
  
*Dermochelys coriacea*  
*Caretta caretta*  
*Lepidochelys olivacea*  
*Lepidochelys kempii*  
*Eretmochelys imbricata*  
*Chelonia mydas*



Fig 1 : Tons of bush meat sold in the Cayenne market between 1986 and 1997. (Data from Tyburn 1994 and Veterinary Services). The dashed line indicates that data had been collected less systematically after this date.

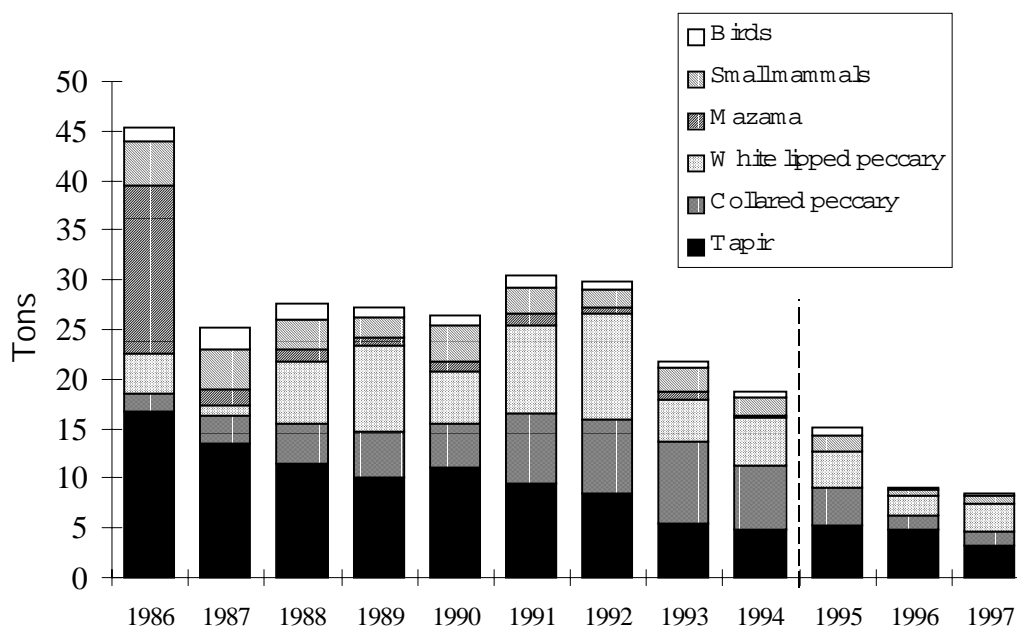


Fig 2 : Number of pieces and proportions of species of small mammals (bottom) and birds (up) sold at the Cayenne Market between 1986 and 1997. (Data from Tyburn 1994 and Veterinary Services). The dashed line indicates that data had been collected less systematically after this date.

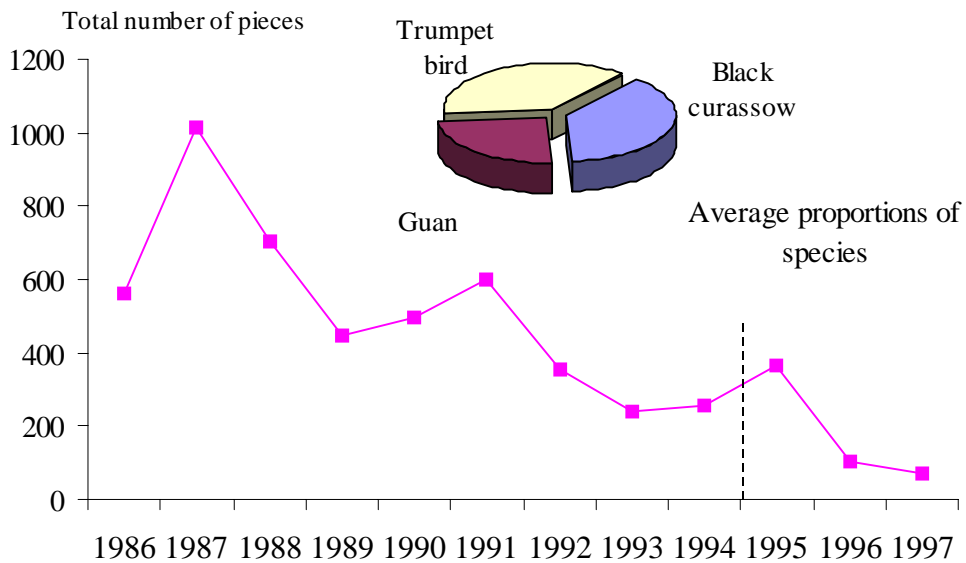
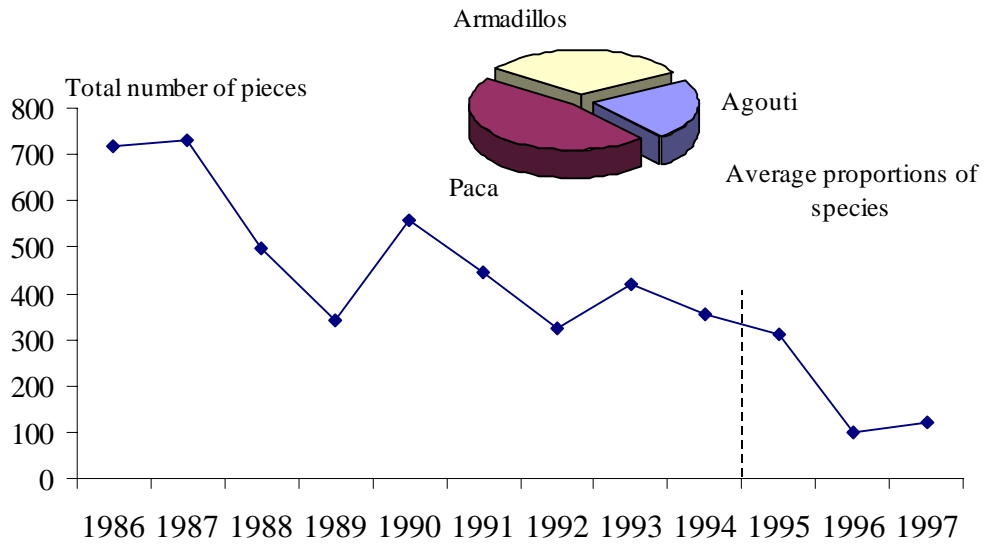


Fig 3. Main study sites on hunting and game species abundances in French Guiana.



*In : Silvius, K. M., R. E. Bodmer and J. M. V. Fragoso, eds. In Press. People in Nature: Wildlife Conservation in South and Central America. Pp. 400-410 Columbia University Press, New York, New York, USA.*

Photo 1. A national ranger explaining the legislation to a local hunter selling bush meat on the side of the road. French Guiana.

