

***REPORT ON THE WILDLIFE
MANAGEMENT AND
HARVESTING CONSULTANCY***

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Report on the Wildlife Management and Harvesting Consultancy

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SECTION I INTRODUCTION

During previous meetings between BOLFOR and the Lomerío community several members had expressed their concern that the wildlife of Lomerío is less abundant now than in the past. The members' interest coincides with plans of BOLFOR for including wildlife into the forest management plans. The community had also expressed a fear that wildlife management means "stop hunting". Consequently, this consultancy played a positive role in the Lomerío community's wildlife management plans. Managing wildlife use by subsistence hunters is a community level process. However the decision of whether to go hunting or what to kill is made on a personal, individual level, and they are based on a variety of socioeconomic reasons. Therefore, it is important to include both community work and education programs within wildlife management planning.

A. Summary of Work Accomplished

Part of the Chiquitano community of Lomerío was approached about wildlife management planning by BOLFOR during three community presentations. BOLFOR personnel received a very positive response from the communities involved. The team was invited to give an additional short-course at Fátima, one of the communities giving a presentation. A short course took place at Fátima between the 22-24 of June (Pictures are in Appendix IV). Both the community presentations and short course were focused on collaborating with the community on their wildlife management plan. BOLFOR would have two roles. First BOLFOR would teach techniques to the community for them to monitor their game use and help them collate the resulting data. Secondly BOLFOR will study the availability of wildlife in their area (project of the Biologist Daniel Guinart) by standard techniques to try to estimate wildlife densities. The community's part would be to monitor their game harvest. The information obtained from the community was promised in didactic versions for teaching purposes.

A short course included participatory mapping with about seventeen community members. At times the numbers grew as other community members came to participate. Game harvest monitoring techniques were taught using a "hands on" approach in recording the information necessary for wildlife management planning. Seventeen students completed the first course.

During this consultancy I also reviewed various documents, and met with several NGO's (some comments on these documents are included in Appendix I). Meetings were held with students to help them improve their research objectives and methods.

B. Summary of Recommendations

1. The community has responded positively to the proposed collaboration of BOLFOR with their wildlife management planning. The short course was a good introduction to part of the process. The importance of following-up on this first contact cannot be over stressed. It will be what makes or break the plan. It is very important that BOLFOR hire a reliable person that can focus 100% of their time

on continuing this contact and teaching more short courses. In the future I would suggest longer courses, of 2-4 hours a day for 1-2 weeks for each community. This would allow the community members to continue at least part of their own daily work. I would say it is important for this follow-up and encouragement to be given for at least the next six months. It will be interesting to see the level of commitment to continued monitoring. I believe that a lot of attention is required immediately for this project to be successful. Although, later this will decrease after the program is established and rolling.

2. I do not recommend that the participatory wildlife plan for Lomerío should be put into the hands of a Bolivian thesis student because it will demand six months of community relations and teaching responsibilities. Instead a university graduate should be contracted because he/she will have less worries of how he/she will achieve his/her thesis from the results. I think the person should be a biologist because he/she will focus on teaching the biology of the animals rather than the community or the people. Of course, a better option would be if an environmental educator was available. In the past it has been impossible for a biology student to get his/her thesis in environmental education at UAGRM.
3. Several wild species should be investigated as to their possible domestication , such as the "conejo" (possibly *Cavia* spp.) and the "tapiti" (*Sylvilagus brasiliensis*). A short questionnaire for evaluating the palatability of these species for the community is suggested.

C. Consultancy Schedule

Month	Days	Activity
May	25	Travel to Bolivia
	26-30	BOLFOR office document revision meetings, planning
June	1-5	BOLFOR office, document revision planning community meetings.
	6-9	First Lomerío trip . Three community meetings will be held with members from seven villages. These meetings had as a plan to introduce the idea of a wildlife management plan.
	19-20	BOLFOR office, planning for short course
	21-25	Lomerío short course on Wildlife Management and self monitoring of game harvest. Participatory habitat mapping.
	26-30	Report writing, redesign of data collection form
July	1	Travel from Bolivia

SECTION II

DOCUMENT REVIEW

A. *"Sustainable Forestry Management"* Draft BOLFOR Project Plan

Management for sustainable use of wildlife should be and is included in this project because the protection of the biological diversity of the Bolivian forests is a clearly stated goal. Management and planning for that use must be included to achieve the stated goal since the forest users are also consumers of many wildlife species,

At this time, the two sites have different fauna use patterns. According to this plan, the Moira forest concession has only sporadic hunting (P. III-4) and the Lomerío study site has more constant hunting pressure. This is probably due to the human population density differences. Sporadic and efficient hunting for large bodied species, especially ungulates, may have considerable short-term impact on the maintenance of biodiversity especially if it is connected to commercial ventures. The problem of the Moira concessions is that we do not know how much hunting there is in the logging areas or over the entire area.

One method to monitor natural resource use in commercial ventures has been developed by the fishing industry. Compliance to fishing laws is verified and biological data collection is also made possible by placing observers on fishing vessels. This could possibly be done on a small scale for the logging camps by random spot checks for the presence of game meat and other products within logging camps. The fishing observer program is arranged so that the fishing industry pays into a fund which is dispersed to the observers through contractors which are independent of the fishing industry. Perhaps wildlife use monitoring in commercial timber programs should be one of independent roles played by the "green" certification process.

The hunting in the Lomerío community forest is, at this time, necessary to the subsistence economy of community members. This subsistence use requires a different strategy for measuring harvest impact on game populations. Since there are many small communities, direct (observational) harvest monitoring would be difficult, very time consuming and require considerable man-power. Probably the best method for this would be to involve the community in their own harvest monitoring. Especially since an active participation by the hunters and their community is required for any game management to be successful. If possible it would be useful to start this active participation from the beginning instead of paying for information, biological specimens, or collaboration. This is especially true if the goal is for the community to continue management after the BOLFOR project is finished. It has been my experience that while paying for specimens is a good way to obtain the desired data, it creates false expectations of their value, as well as hinders future voluntary participation in their own management plan.

What would be helpful is the inclusion in BOLFOR plans of a community oriented, participatory courses in natural resource management. Community members already know the basics of management from their experience with cattle, chickens and other domestic livestock.

This type of training should not be limited to one or two communities, or even to hunters. But each community, at least those using the forest for hunting, should be given the opportunity to have this training. A good result might be obtained by first offering a training session to a few from each community. This will allow the fine-tuning of teaching techniques and will produce some trained people to help with the community level course work. In my own experience I have found it necessary to explain things to a small group, then the leaders, and then again to each man or household individually so that they each understand. This is a very long process, and results are not always immediately evident. These training courses would allow personal attention to individuals. And, because they are participatory, they will help identify relevant social and cultural aspects of natural resource use. The results of these training workshops could be some interesting and publishable training materials as well as an integration of the community into the program.

The BOLFOR Sustainable Forestry Plan , on page XI-3, states that there will be a sociologist/ anthropologist responsible for developing arrangements for collection of local knowledge through direct contact as well as techniques such as village administered surveys. It should be understood that the collection of in-depth local knowledge is delicate work. It should not be taken lightly. It depends on good rapport between the investigator and a cultural specialist (person in the community with specialist knowledge about a particular theme), as the in-depth knowledge often resides in the hands of a few specific, knowledgeable people. A rapid assessment for this type of knowledge would probably be impossible.

What will be possible to obtain is participatory information for a basic knowledge base. By using participatory means for developing habitat mapping, species lists and other preliminary information can be gathered very quickly (See report on first course later in this report). However it is very important that all information be double-checked with the community before being published. Whenever possible the cultural specialists should be used to review the gathered information and prepare appropriate Chiquitano information to include. Some information may be sacred and inappropriate for publication.

With the collection of ethnobiological data there is the wonderful possibility to improve the communities appreciation of the value of this information. By including a member of the community to be taught along with the scientific investigator (as a Co-investigator, the chances of that knowledge continuing within the culture are improved (See Appendix XI, Results of a workshop about participatory investigations in wildlife). I believe CI has a program doing just this type of work with ethnobotany (Apprentice Shaman). The fact that an outsider is interested in the information often demonstrates the value of this information to the community. It is important to remember that detailed information can often be obtained only through the collaboration of the specialist. Community wide surveys (by this I assume it is meant that each member of the community is interviewed) will not necessarily obtain as much quality information as the same amount of time spent with the cultural specialist. It is perfectly legitimate to ask the community who is the community specialist (in fact, this has been done by many anthropologists). Asking who is the community specialist is important especially if the information is to be written in book form for use in their schools.

I am not sure what is meant by a village administered survey but I have seen first-hand how some surveys have been handled by one community where I have worked. It usually boiled down to the man with the most interest (monetary) in completing the survey doing the work. For example, the "promotor de salud" completed the survey on medicinal plants. If local knowledge is really to be included, much care must be taken as to how it is obtained, and the information must be returned to the community in the form they suggest is the best. If this commitment to returning the information is met then the collaboration will be greatly enhanced. Especially since they are well aware that this knowledge is in danger of extinction as the young people are influenced by western ways.

Using Participatory Rapid Assessment (PRA) could be a good way to get basic information. However, to really help the people make and use a wildlife management plan, numerous initial visits are very necessary. The short course (described in full later) was geared towards this end. The monitoring techniques taught to 17 men in the course need to have follow-up. I would suggest a 6-month contract to focus on keeping the communities stimulated, teaching more short courses, and trying to expand the data collection system. It was originally planned to use the present project personnel and Bolivian thesis students to collect the information from the 17 participants. I do not believe this is the best way to handle the additional work load since the system is just being created and there is a need for re-enforcement and expansion of the training sessions. The best way is to hire a Bolivian biologist or an environmental educator with experience in culture and interested in training for at least a 6 month period.

SECTION III
REVIEW OF WILDLIFE HARVEST MONITORING PROJECT IN LOMERIO

(The following is from a memo sent (about June 3, 1995) to Damián Rumiz, William Cordero and John Nittler).

Based mostly on the written proposal:

A. Fauna Silvestre y su Uso en Lomerío (*by Daniel Guinart Sureda*)

This is a project that is very broad, covering not only the obtention of wildlife density estimates but also the collection of hunting pressure from the Chiquitano community. Both kinds of information are necessary to determine the sustainability of the wildlife harvest. The methods proposed to obtain the wildlife densities are some of the only established and/or known methods although they are not without their limitations. I will confine my comments to the methods of collecting the wildlife harvest data.

First of all I see one possible conflict between the stated mitigative measure (#3 in EA executive summary p 6, Dickinson et al. 1993) of training of community members in sustainable forest and wildlife management, and the paying of collaborators. If the collaborators are paid for their participation they will probably not continue the work after the project ends. If the goal is only to obtain the harvest information, then paying for specimens, albeit with sugar, soap or other products is probably the most efficient way to assure that the specimens are available. But if the goal is to promote the integration of wildlife management into the community, then probably the BOLFOR Project should focus on educating and training the people in the "why" of gathering the specimens (such as skulls, reproductive tracts, stomach contents). This is a much slower process and requires that considerable time be spent explaining and teaching and may not have immediate results of data collected. However, the end result could be that the community itself would be interested in the management of their own resources and thus would be more likely to continue after the project is finished. It would also be one of the few places in South America that have self management of the resources (the KUNA being a good example of this). However once a pattern of paying for information is established it becomes very difficult to change it, especially under the confines of "BOLFOR".

For example, I need some sort of guidance on how to proceed for the short course I am supposed to teach; whether I should be preparing "para-biólogos" or in other words community technicians, to collect the information, or whether I should be teaching basic wildlife (and resource) management in order to promote community collaboration for their own wildlife management. The teaching techniques (not to mention content) are a little different with the prior being more one-sided and the latter being more participatory. Training community members to collect the data on hunting and fishing harvest would include techniques for weighing animals, filling out data sheets, and preparation of specimens. But initially a participatory approach would help them realize they already have a lot of the basic logic involved in management from experience with chickens, pigs and cattle. The hands on experience would come later when collaboration was agreed upon. As I've said before, the second option of promoting community

collaboration may be slower, but the result may be a better integration of management thinking into the community.

A decision on which way to proceed will affect the choosing of study sites, on the first field trip. It may depend on different factors. The voluntary participatory approach would allow more flexibility of expansion to other areas, whereas the data collection emphasis would necessarily be limited by the time of the principle investigator to collect the data from the "technicians"(*end of memo*).

As a response to the memo I was told to focus on helping the community develop their own wildlife plan. This would consist in trying to set up a working, and active interest in game harvest monitoring by the community. This is the first step in a real community wildlife management plan. And it will take time for it to actually get under way.

B. Cacería y uso de la Fauna Silvestre por las Comunidades de Lomerío (*by Mario Arrien*)

This is a small part of an in-progress study by an anthropology master's student (Bolivian) studying at the University of Vienna. The overall project is very ambitious and possibly lacking in focus. However the obtainable information can be very useful in implementation of monitoring plans. It was not clearly stated in the project, the number of people he had monitored in the past, nor the number of people to be included in the portion funded by BOLFOR.

The results of the overall research will be a small amount about many different activities but probably no one theme will be well developed (according to the project proposal). There is also a question of the level of precision that is said to be involved. For example, an exact location of the kill site of each animal is probably not necessary as long as a general location is available and localized on maps. So that taking the time to accompany a hunter to the actual kill site with a GPS is probably not a useful way to spend research time. What would be more useful to wildlife planning would be a map of the hunting zones and locations of waterholes, etc. This would require the use of the GPS for a few days along with available maps. It is possible to get the preliminary map with the participatory process to be used in the short courses.

There is an indication that the importance of fish and game in the subsistence resources harvested within the Lomerio area varies between communities. This difference will influence the representativeness of the communities chosen for game monitoring and any extrapolations made from that data.

I have some doubts about using interviews to record hunting and fishing results. First of all, the problem of informant memory reliability in addition to "the telescoping effect" can distort the results. Usually the small animals will be the first to be forgotten and thus may be under-represented in the results. Secondly, the desire for status (thus more game reported), or hiding results that an informant may think need to be hidden, can complicate results in both directions. However this project states that the hunting results are to be noted by the hunter, who weighs the animals, and they will be brought together weekly. This may be the best we can hope for since the investigator has planned so many other tasks to complete.

The study of time allocation in a community can be a full time occupation and probably cannot be effectively completed because so many other tasks are planned. The methods of the presented project are unclear as to how much effort Mario planned to devote to time allocation. Therefore it is unclear how well his results will reflect the actual time spent hunting or fishing by community members. It is unlikely that he will be able to adequately sample enough people for this result to be generalized, considering the amount of other projected information he plans to collect.

At a later meeting with Mario in Concepción (June 24) he provided some preliminary data. In particular he summarized the animals harvested, and time spent harvesting. I reviewed this data and asked for a few revisions, calculations, and clarifications. In order for him to obtain a sample size of people he needs to calculate for a fluctuation in population sizes. I referred him to the Siona/Secoya book by Vickers and to Michael Alvard's thesis which discusses how they handled a similar problem.

C. Data collected from questionnaires during the Ethnobotany study

Eleven questionnaires were administered by the BOLFOR ethnobotany team. These were focused on obtaining initial information on the general importance of different wildlife species in a subsistence economy.

Of the eleven interviews, 7 were done by Marisol Toledo and 4 were done by Miguel del Aguila. The results are difficult to determine precisely. Table I lists the important game species and their relative importance, as reported by the interviewees of 11 people. Many said there were no "cazadores" in the location, but this might indicate there are no commercial hunters.

SECTION IV
RESULTS OF MEETINGS WITH NGO's AND STUDENTS

A. Mario Arrien

This investigator was briefed on all of the above mentioned points about his research. He was also informed that the information on kg/man-hour or efficiency of hunting was only useful to the wildlife manager if it includes un-successful hunting trips also. The reported hunting trips should be made for those exclusively about hunting and the animals killed. Reporting on the engagement of other activities should not be included because of the difficulty of dividing the time between activities. Other suggestions were made as to how to analyze the data and what to do about gaps in information during the meeting in Concepción.

TABLE I

Important game species indicated by previous questionnaires
Listed in order of general importance

Nombre Común Español	Nombre Científico	Nombre Chiquitano
Tatu	<i>Dasypus novemcinctus</i>	
Urina	<i>Mazama gouazoubira</i>	
Jochi Colorado	<i>Dasyprocta variegata</i>	
Jochi Pintado	<i>Agouti paca</i>	
Anta	<i>Tapirus terrestris</i>	
Huaso	<i>Mazama americana</i>	
Taitetu	<i>Tayassu tajacu</i>	
Tropero	<i>Tayassu pecari</i>	
Tejon	<i>Nasua nasua</i>	
Pava	<i>Penelope jacquacu</i>	
Huaracachi	<i>Ortalis motmot</i>	
Perdiz	<i>Tinamous spp.</i>	

This table was based on the responses given by 11 informants to questions posed by 2 interviewers during more lengthy interviews about plant knowledge. The two interviewers were Marisol Toledo (7) and Miguel del Aguila (4). Eight of the 11 interviews listed the "tatu" as the most commonly used game species. The other three listed the "urina" as the most used. Of these

three, one listed "tatu" as second, one listed "tatu" as fourth after other two large rodents and the third interview listed "tatu" as the fifth important animal after the rodents and "taitetu." These responses could vary because of the level of understanding of the question. It is not clear by the rough data how the question was asked. In other words, the question "Cuál es más importante?" is different than "Cuál se come más?".

I used the responses on these questionnaires to determine the most important animals to use on the revised game harvest monitoring data sheets (Appendix VII).

B. APCOB

I renewed my acquaintance with Jürgens Riester in an initial meeting and asked for another meeting with Damián present. Jürgens Riester, Chela Zolezzi, Damián Rumiz and I met at the APCOB office the following morning.

An explanation was offered about the expectations of the BOLFOR project with respect to the wildlife of the Lomerio region. The point was made that fauna must be included in sustainable management plans in order to obtain green certification. It was also expressed by the BOLFOR representatives that the object is to obtain collaboration from the community and to promote the management of the resources under the community's own initiative.

Riester offered some sources of literature which helped to improve the understanding of the "cosmovisión" of the Chiquitano people.

Chela made the point that there is a real problem of animal protein acquisition for the Chiquitanos. It was pointed out that there are two types of hunting; that for daily consumption and that for "Fiestas". The prior is usually near to the village and lasts one day whereas the latter can be more extended because they go hunting for a longer period of time (a week). This could be a very important point for sampling as these periods must be represented in any sampling scheme.

Another point made by APCOB was that the integration of these people into the external economic system is changing game harvesting as an activity. Since there are less animals available and less land, alternative schemes may be necessary. At this point Damián asked if an alternative might be the use and promotion of more domestic animals. Some suggested alternatives to chickens and pigs are spiny rats (Echimyidae) and tortoises (a species which may have too slow a growth rate to be effectively productive, but is worth looking into).

Jürgens Riester added that he is also concerned about hunters which hunt for sport and are especially invading the area near Monte Verde. These hunters kill many animals and leave them to rot. Another suggestion by Riester was for BOLFOR to include questions about how the Chiquitanos hunt now. For example, if they have already killed one peccary will they continue to shoot at the rest of the herd. I did a similar questionnaire (Likert scaled) among the Sirionó and the result was very interesting. He comments that in the past they (the Chiquitanos) would not have killed all the animals they could aim at.

Chela expressed an interest in making sure the information gathered is returned to the community. She suggested that there should be a coordination of periodic discussion with the community of the results obtained. She used as an example APCOB's project of small gardens since they meet every three months with the communities involved to discuss the work and solve problems.

Riester was asked about his opinion over the necessity of including the Catholic church representatives in the discussion of plans and later information sharing. His opinion is that there were certain "control" and "power" situations and BOLFOR could find itself in the middle. He suggested BOLFOR not make the first approach as it might make problems with the community.

APCOB was told about the planned short course on wildlife management to be taught in the community of Lomerío.

SECTION V
REPORTS ON ACTIVITIES COMPLETED DURING THE CONSULTANCY

A. Report on the First Field Trip to Lomerío and Community Presentations

Date:	Activity
June 6	Travel to Lomerío, Planning Community Presentations
June 7	Presentation in Fátima
June 8	Presentations in El Cerrito and in Las Trancas
June 9	Return to Santa Cruz

Objectives and Content of the Community Presentations

1. To introduce the idea of a wildlife management plan.

Explanation of what "management" means by using examples of the way they already manage some of their activities, such as farming. Explain that a wildlife management plan does not differ greatly from what they do with chickens and cattle.

Suggest the idea of them having their own wildlife management plan. It will be for them, and all decisions will be made by them with BOLFOR offering assistance and helping them to develop the plan

Explain that the principal information needed for this plan is how many animals they hunt and how many there are in the forest. BOLFOR project will help them find out how many animals there are in the forest, but they will be responsible to find out how many animals they harvest. BOLFOR will collaborate with them on this portion by supplying weighing scales and data notation materials for reporting the harvest information. Daniel Guinart talked briefly about some of the techniques used to evaluate wildlife diversity.

BOLFOR will then collaborate with them to unite the two sources of information (as well as other information, ie. diet, reproduction, age structure) into management suggestions. These will be made available for them to use in their decision making process.

2. To promote the idea of ethnozoological studies.

The BOLFOR Project offers to help them collect the information about the wildlife from the knowledgeable cultural specialists in order to RETURN this information to the communities in didactic form for the schoolchildren. This would consist in one (or a series, depending on the quantity of available information) booklet with the information collected about each of the animals along with a picture of the animals and their names in Chiquitano.

The informants names would all be listed so that their future generations would have a source of pride for the knowledge of their ancestors.

3. To invite the communities to send participants to the short course.

A wildlife management and harvest monitoring short course was planned for 22-24 of June (location was unspecified at that time). At least 2 members of each community were invited to attend. Participating community members should be hunters with at least a minimum level of reading and writing. The two participants from each community would be requested to report to their communities what they had learned.

Communities were requested to discuss the idea of a wildlife management plan (as explained in the community presentation) and list the personnel interested in the short course. They were asked to list all the persons interested in the course prioritizing them in order of most important. They were asked to list all community members interested in attending so that BOLFOR can have an idea of the community interest in this work to see if similar short courses should be held in each community.

Food for the course participants during the course would be supplied by BOLFOR as well as transportation to and from the location where the course will be held.

4. Slides of wildlife were shown.

Slides of animals from the region and a few from elsewhere were shown to the community and they were asked to name the animals. Slides of some of the Sirionó game harvest were shown with pictures of Sirionó taking their own data. This allowed the Chiquitanos to understand that a wildlife management plan did not necessarily mean that hunting would be prohibited. Slide of some of the techniques used for determining wildlife diversity in the Lomerio region were shown. These included pictures of scats and tracks of different animals.

B. Results of Community Meetings after Presentations

B1. Fátima - June 7th

Although the communities of Todos Santos and Florida were also invited to this meeting, their representatives did not arrive and only community members from Fátima were present. The Alcalde of Fátima is Juan Mangari.

The meeting started later than we had expected (time arranged was 6 PM) but after the "Novena" in the Church we were finally able to express our ideas. About 20 adult males attended the meeting along with about 10 women. The slide show was attended by at least 60 people including children.

The idea of a management plan was readily accepted and was expressed by the community to be necessary. There were some questions as to what was considered acceptable wildlife use. I was asked if 30 urinas (Mazama gouazoubira) in one year was excessive. I responded that it depended on the amount of area they were harvested from and whether there were still some urinas. Then one man started describing a situation (talking in third person) of a wager between two men as to who could kill the most of these animals during one year. He finished by expressing (in the first person) that he had lost the bet by only a few animals because he had killed about 25 and the other had bagged 30. He wondered what I thought of that situation and I returned the question by asking what he thought about it. He said it probably wasn't a very good idea. I again re-iterated that the management plan would be for them and that decisions of this type would have to be made by them as a community.

The community expressed concern that other communities be included in the management plan because they were also coming into the zone to hunt. I stated that all the communities must eventually be included but we could only start working with a few because of limited personnel etc. and that those near the forest area were those with whom it is most logical to start.

Those present were asked to name the game animals and a list of 25 species was made. The list included all the felids but until they were prodded, it didn't include the Mazama americana. It seems that this animal may be very scarce at this time. The emphasis with which they gave the names of the felids suggests some sort of importance to the culture, or it could be fear and the need to protect their domestic animals. They did mention that the "gato brasil" (Felis wiedii) eats their chickens.

After the slide show the adults returned to discuss the plan of having a course. The community members again expressed their desire for a management plan and they wanted more members of their community to be able to attend. The alcalde offered their community as the site for the short course and offered a house for the students to sleep and a schoolroom to be used for teaching. They re-iterated their interest in having the course in their community by talking about all of the conveniences they could offer.

We asked them to inform the neighboring communities about the short course and invite them to send students. We agreed to let them know where the course will be held when it was decided.

The Fátima community members also expressed a concern for their fisheries resource. They were told that if there was sufficient interest BOLFOR could possibly collaborate with them on a fisheries plan, but that the wildlife plan is a beginning.

B2.El Cerrito - June 8th

Community members from El Cerrito and Santa Anita attended the meeting which started at about 9 am. The alcalde of El Cerrito is Miguel Antonio Pesoa and the alcalde of San Antonio is Melchor Antezana.

This meeting also went well because the community members understood and expressed an interest in a wildlife management plan. Again the need for the collaboration of the neighboring communities was expressed by those present. One community member asked the time period in which the teaching materials would be available. I explained that BOLFOR needs to be able to obtain the information from the community and edit the book (or books) first and that this can not occur instantaneously. Damián expressed that he thought something could be returned to the community in about 1 year. They expressed their approval of this.

These two communities also mentioned the need for the management plan to include all the communities because there are hunters that come from villages away from the "good monte". I explained how the Sirionó were forced to react strongly against the sport hunters that were coming to hunt at their water holes. I also expressed that this was something that the community had to control.

One man (Francisco Cuasace Gutiérrez) talked for quite some time after the slide show. He spoke about how he had been thinking that past poor management had made it very difficult for them to exist by hunting wild animals. He said he thought there needed to be a balance between the wild animals they hunt and the domesticated animals they farmed. He was quite clear that domesticated animals would help them to lower the hunting pressure. He stated that they had presented several projects for more domesticated animals. But he did not ask BOLFOR for help, and we did not offer it although this could be something BOLFOR might want to do. This man is smart and articulate. He has probably been active in organizations which have taught him these management concepts.

It is likely that he is, or has been, associated with the church, as he mentioned that they had divided Lomerio into 5 sections:

1. San Antonio
2. Puquio
3. El Cerrito, Las Trancas, Sta. Rosario, Puesto Nuevo, Santa Anita
4. Fátima, Todos Santos, Florida
5. Montero, Surusubi

Burning the forest regions was mentioned by some to be a problem for fauna as well as for honey production.

B3.Las Trancas - June 8th

Both Las Trancas and Puesto Nuevo were represented in this meeting. The alcalde of Las Trancas is Juan Rivera and of Puesto Nuevo is Juan Faldin Aguilar

This meeting went well although there seemed to be less demonstrated enthusiasm which may have resulted in less discussion and questions. The same things were mentioned as problems, such as over-burning and protection. However the response was not great when we made the list of hunted animals. One elderly lady (possibly the alcalde's mother) was the person giving the most information and the names of the animals in Chiquitano. She will probably be a valuable person for information related to the cultural knowledge. She seemed very interested that the information be put into books for her grand-children.

Of the three meetings, I would say that this was the least successful.

C. Conclusions to the Preliminary Community Presentations

The 5 communities that participated in the presentations of the ideas for wildlife management were all in agreement of the need for such a program although the last two (Las Trancas and Puesto Nuevo) seemed less enthusiastic. The community of Fátima was the most interested and offered their village as the site for the short course. All the communities wished that more than two participants from each community could attend the short course. They expressed that it would be better to have a short course in each community. The alcalde of Fátima sent letters with us to various communities, evidently to ask for a meeting on Saturday to discuss the options with other communities. All participants agreed that it was possible for their community to decide on attendance by Saturday and to have a list of those wishing to attend available for a BOLFOR person to collect on Sunday. It was stressed that a list of all the persons interested in attending this course would emphasize the need for BOLFOR collaboration in the wildlife management planning.

The idea of having their own cultural knowledge in didactic form was greatly appreciated. It is hoped that BOLFOR will obtain the collaboration of the informants by offering to return something in written form to the community. The ethnozoological knowledge will not only help form the wildlife plan, but may also prove to be of great benefit to the forestry planning in that wildlife food species could be indicated. This information should be carefully collected from those cultural specialists still surviving. Ethnobiological information is more than just lists of plants and animals used, as is sometimes presented in the literature especially when the interest is purely pharmaceutical. The person assigned to this task should be culturally aware so that westernized thought patterns do not overwhelm the cultural structure of the information. The classification system of the people should be carefully investigated as well as the cultural significance of the plants and animals. This is not necessarily accomplished by a series of questionnaires as was previously done with plants. Techniques for investigating ethnoclassification systems have been developed by Brent Berlin as well as others and are available in the literature. This part of the project may be the hardest for students to accomplish without close guidance especially because of their lack of experience and sometimes cultural sensitivity. Mythology is often a very important source of the ecological information within the culture.

The need for follow-up of this meeting and the short course is very evident. The proposed short course will only train a few members from each community to report harvest data. This data will need to be collected into a central pool by continued contact with the communities. There is also a real need to continue training on management practices and to include each of the communities to be involved in the overall management plan. Training and education seems to be what the communities want and can most benefit from the BOLFOR project. And it is money well spent because it could make a permanent effect on the way that resources are used in Lomerio.

D. Report on the First Short Course on Wildlife Management held in Fátima, Lomerío, Bolivia, 22-24 June 1995.

The course started at 2 PM on the 22 of June with 16 community members present. On the morning of the 23 rd another student presented himself because he had been told the preceding day (by outsiders) that the course would begin in the morning so that he went to work his farm plot. Since most of what we had covered was written in the handout (Appendix I) he was accepted to the course and proved to be a valuable addition. This brought the total to 17 students, three short of the projected 20. This was not due to a lack of interest on the part of the community members of Fátima where 22 members had originally signed up for the course. But it was because of the false information given by others about when the course would start. Most of the other men from Fátima had gone to work their farm plots due to this erroneous information.

One community (El Cerrito) did not send any participants even though we had an interesting reception and discussion during our preliminary community meetings. The reason for this lack of participation is unknown, and any comments by me would be pure speculation. However it is important to use subtle methods to find out the reason for this

apparent lack of interest because if it stems from distrust or bad feelings within the community, the success of the project could be jeopardized.

Evaluation of this course was not made by pre-and post tests because of the intimidating effect of a test on the first day of a course. I've tried this evaluation technique in other locations and found it did not adequately reflect the practical points learned by the participants. Also since the course was planned to be participatory, it was hoped that as much information would come from the students side as from ours, and such structured evaluation may be very one-sided. I have however included a list of lessons learned and how I would change various aspects of the course. It is hoped that, as a result of this experience, several people can be expected to monitor their own hunting harvest and there will be a general understanding of why reproductive organs and skulls must be collected for further scientific analysis. The extent of future collaboration will be the true evaluation of this short course.

The official list of course participants is as follows:

1. Ciriaco Mengariz Rodriguez (Secretario of Florida)
2. Francisco Tomichá Parapaino (Alcalde of Florida)
3. Jose Sorioco Chuvé (Todos Santos)
4. Miguel Bailaba Soriocó (Todos Santos)
5. Juan de Dios Surubi Garcia (Puesto Nuevo)
6. Santiago Rodriguez Faldín (Las Trancas)
7. Francisco Cuasace Aguilar (Santa Anita)
8. Cristobal Parachay Paticú (Fátima)
9. Juan Mangari Pachuri (Mayor of Fátima)
10. Nicolás Tomichá Rodriguez (Fátima)
11. Pedro Peña Aguilar (Fátima)
12. Ignacio Cuasace Poesa (Fátima)
13. Lorenzo Rodriguez Chuvé (Fátima)
14. Pedro Rodriguez Chuvé (Fátima)
15. Manuel Castro Sorioco (Fátima)
16. Jose Chuvé Aguilar (Fátima)
17. Juan Rodríguez Chuvé (Fátima)

After a brief explanation of the BOLFOR project by Dr. Damián Rumiz, each of the persons present introduced themselves and stated the name of their village. Following the brief introduction, I began the short course by introducing various terms used in ecology with their respective definitions. Each person was given a course syllabus which included most of the definitions so that less time would be used by writing them on the board for them to copy (See Appendix I, Course syllabus). The level of understanding was quite good, most of the students were bright and did not hesitate to voice their uncertainty of the meaning of the words I used.

The energy cycle and food chain were described briefly using cut-out pictures of various animals and people. It was explained that each population of animals must be less numerous than the population of the food organisms available to them. The food pyramid

was shown using cut-outs and ending with one man, and/or one jaguar. The food chain was explained using the farm plot as an example, (one with which they could relate) because many wildlife species are regularly found in farm plots.

As a finish to the first section and a definition of "habitat" we began a participatory exercise to describe the different vegetation zones which the community members recognize. This exercise consisted in them listing the vegetation types and describing them with the trees and animals found in each. Emphasis was placed in discovering what made each of the zones different from the others.

When a picture of the animal was available it was placed under the name of the habitat. The list is probably not complete as yet, in fact in the later participatory mapping exercise other habitats were revealed. But this method allowed an expression of what they know as their environment. The lists of habitats and species is listed in Appendix II and photographs of the course are in Appendix IV.

Many of the plant species used by the Lomerio wildlife as food are used by more than one animal species (See Table II). In Table II the wildlife species using each is given along side each listed food source.

It is evident that most of the fruit trees are not commercially important for their wood (See Lomerio Management Plan (Olivera and Raessens 1994)). Several proposed forest silvicultural techniques could be highly disruptive of game food availability. Girdling or killing those trees that are competitive to the wood species may adversely effect game food species.

After the habitat types were elicited they were used as a baseline to produce a participatory map of their zone. Pictures of the resulting map are included in the Appendix IV. Again I used pictures (black and white) of the main mammals and birds. The students were asked to place the animals where they wished and to draw the rivers, steams and rock formations. Some photocopies of trees were used as well and some organisms were drawn with markers.

When looking at the map it becomes obvious that two things are happening. First of all most animals are reported for the "monte alto", but the "chaco" and "barbecho" areas also have considerable wildlife species diversity. The tendency was to place the animals next to specific tree species that were previously placed on the board. This means animals were often grouped around certain fruit trees. The results are very interesting. The information obtained through the two techniques is brought together and is shown in Table II, the food species list.

A final participatory map was drawn using the actual representation of the Lomerio community as a baseline. A representative of each community was asked to sketch the pampa, pampa monte and chacos onto the map. This map can serve as a beginning for further community mapping work as well as for planning the wildlife inventories (Appendix XII).

The third section of the short course focused on wildlife management, including definitions of both the terms "wildlife" and "management" as well as others. I was quite surprised at the interest in the production calculation model. This seemed to be very important to them. I reviewed it several times and finally wrote the formula onto other sheets so that some of the slower writers could write the notes in their notebooks on their own time. However, the main reason I showed them the production model was to impress them as to how important the biological data can be to the equation. This goal was not completely met, in that a complete detailed explanation would have been very time consuming, and the other topics goals in the course would not have been achieved. However, I believe they were impressed about the importance of the biological material.

During this section we talked about the requirements for wildlife: food, water and cover and as to what they view as limitations to wildlife populations in Lomerio. From this line of questioning we turned to their concern that the role of fire as a limiting factor was very strong. We discussed some of the dangers of fire and they were asked about solutions. Directional felling of trees to enable fire containment of chaco burning was considered very difficult to accomplish. Some students suggested that a wider protection strip should be cleared between the chaco rubbish and the un-cut forest. One member suggested they make sure they burn their fields with a group of people (minga).

TABLE II

Plant Species of Dietary Importance to Wildlife in Lomerío
Results of Participatory Habitat Mapping

Common Name	Scientific Name	Comercial Listing *	Wildlife which consumes this food species
Bibosi	<i>Ficus spp.</i>	OTCOM	Just about everything, Tropero, Mono 4- ojos, Loros, Pava campanilla, anta, Perico, Tejon, Puerco Espin, Jochi Calucha, Urina, Huaso, Melero.
Bi	<i>Genipa americana</i>	SNVAL	Anta, Jochi Pintado, Tejon, Urina
Motacú	<i>Scheelea princeps</i>		Tropero, Anta, Pejiche, Jochi pintado, Jochi caluche, Puerco espin, Tejon
Tarumá	<i>Vitex sp.</i>	SNVAL	Tropero, urina
Penoco	<i>Pithecellobium saman</i>	SNVAL	Mono 4-ojos, Mono cotudo, Jochi caluche, Urina
Azucaro	<i>Spondias mombin</i>	OTCOM	Mono 4-ojos
Pacobillo	<i>Capparis prisca</i>		Pava campanilla, Tejon
Achaicharu	<i>Rheedia sp.</i>		Tucan
Piton	<i>Trichilia elegans</i>		Anta, Toucan, Pava coto-colorado
Sumuque	<i>Syagrus sancona</i>	SNVAL	Anta, Puerco espin
Paquio	<i>Hymenaea courbaril</i>	OTCOM	Anta, Jochi Pintado, Tejon, Jochi caluche

Common Name	Scientific Name	Comercial Listing *	Wildlife which consumes this food species
Almendo	<i>Dipteryx sp.?</i>	SNVAL	Anta, Jochi caluche,
Garabatá	<i>Bromelia sp.</i>		Anta, Taitetu
Ambaibo	<i>Cecropia spp.</i>		Pava coto-colorado
Aguai	<i>Pouteria sp.</i>	SNVAL	Pava coto-colorado, Mutun, Pava campanilla
Guaparu			Mutun, pava campanilla, Tejon
Sirari	<i>Peltogyne sp.</i>		Pava campanilla, Urina, Tejon
Total			Jochi Pintado, Peji, Puerco espin, Urina
Toco	<i>Enterlobium contortisiliquum</i>	OTCOM	Jochi caluche, Taitetu, Mazama
Guapa	<i>Guadua sp.</i>		Taitetu
Momoqui	<i>Caesalpinia pluviosa</i>	OTCOM	Mono Cotudo
Isotoubó	<i>Caesalpinia sp. ?</i>		Puerco Espin, Urina

* These listings are from "Proyecto Forestal Comunal para la Zona Chiquitana de Lomerio" (segundo borrador, 1994, APCOB and CICOL).

The discussion moved on to alternatives to hunting. One of the suggestions they made, was to produce alternative protein sources either by fish farming or domestic animals. Damián made clear that BOLFOR could not promise to do those types of projects but they could send proposals to alternative funding possibilities. Later conversation indicated the possibility that a small rodent "conejo" (which might be a cavia) could be domesticated. A letter was sent to John Nittler (Appendix V) requesting his help in finding funding for fish farming and other alternatives including the training of technicians from the community.

The forth section of the course was focused on teaching the skills to report the wildlife harvest. Until the students' ability to read and write could be established, we decided to train with an already existing data collection form which had been developed for use with the Sirionó (Appendix VI), at least until the situation was evaluated.

One thing became evident when the monitoring training began. The students had various educational levels. The forms for entering data were not as easy for them to learn as was expected. Perhaps the prior Sirionó experience with the important questions that are asked made it easier for them to learn to fill out this form. Anyway, as a result I have made a new design which can be improved as more obvious symbols become available (See Appendix VII). This form can be substituted for those hunters not comfortable with

the old form.

Each student was given a booklet to enter the data, pencils, a permanent marker, a 50 kg and a 12 kg hanging scale. They practiced with this equipment by weighing bags of different weight and entering the information from various practice scenarios. For example I would invent the information of who went hunting, what he killed etc. and they would fill in their books. Some students learned very rapidly and thus were capable of handling many scenarios, while others were quite slow. One non-literate participant was not able to take part in this section because the forms were designed for literate people. This impressed upon me the need for non-literate data collection forms (Appendix VII).

The minimum data collection necessary to obtain the information necessary to use the production model would be a skull (broken or complete) which is marked with the following symbols:

New Symbols are :

4 Macho

B Hembra

U Hembra con Leche

X)Bebé en la barriga? una X representa cada uno.

An X would be used to indicate each fetus, so that if there were three fetuses there would be 3 x's.

The weight in kg. could also be put on the skull. However, it is better to have a duplicate data collection on paper so that if the dog runs off with the skull (or any other mysterious skull snatcher) not everything is lost.

The fifth section of the short course dealt with the skulls and their importance in the data collection scheme. To begin the section I presented a copy of a letter from the Head of the Zoology Department of the Museum (Museo de Historia Natural Noel Kempff Mercado) to the Lomerío community (Appendix VIII). The letter offers to help the Lomerío community with their studies for their wildlife management plan. It explains that the museum is not in existence to sell specimens and that there is no commercial value to any specimen they might wish to keep at the museum.

During this time we looked at the skulls of various ungulates in order to evaluate their relative age. Most of the students had some difficulty judging between young adult and first year animals (adults have the 3rd molar completely emerged), but with practice, they learned. Most agreed that the surest method for this information to be collected is by saving the skull.

The sixth section about data collection processes for fetuses was cut short because of lack of time and materials. The process was introduced to the students and the amount of useful information obtainable from fetuses was stressed. It was suggested that the collection technique could be explained later. When fetuses are collected, they could be placed in plastic bags upon which the symbols of the female and her KG is also written with the marker. If fetuses are collected the people need to be taught how to remove them including the parts that are needed, in particular the ovaries, tubes and the fetuses. I am pretty sure that I have some fetal material in the museum at La Paz that could be borrowed for training purposes. One of the major points to be stressed is the importance the material has to their wildlife management plan. That might be accomplished by showing them how it is done. This is also the first step also to get some local young people stimulated to study the theme of wildlife management.

As a conclusion to the course we had a small ceremony to hand out the diplomas (see Appendix IX) and eat cake. The students seemed pleased to receive their certificates and we were given two letters from the community . The first was the previously mentioned letter to John Nittler (Appendix V), and the second was a letter from the community thanking us for bringing the course to Fátima (See Appendix X).

SECTION VI RECOMMENDATIONS

Lessons learned during the short course, and things I would do differently

1. The most important lesson was the amazing participation from the community and the large amount of information they contributed. The information will serve as a valuable tool for the further field investigations to be managed by Daniel Guinart. The amount of information might have been greater if more time had been available to explore in-depth, the species lists of the various habitats.

Some of the information on the maps was not as detailed as it could be. For example, the "salitrales" and "guapales", and "chaparal" areas were placed by me. Because this was a first attempt, and the main object of the course was not the mapping, but to teach the methods and importance of auto-monitoring their own game take. There was little time to cover the mapping with added detail.

If I was to do more participatory mapping, I would want to split the class into smaller groups and have each of them make a map. Then I would bring them all together for them to discuss their maps. This would require tables or large flat surfaces because it is really easier to visualize a map if it is oriented horizontally and in the same direction as the real world.

Another need is to develop an adequate distance scale in order for the participants to include all of the detail they feel is appropriate. The main recommendation is to continue the participatory mapping in the Lomerio community.

2. If I taught the course on a regular basis it would be nice to invest in a large number of color copies of the animals drawings. This would insure that there would be enough copies of the animals to avoid taking the previous map apart before it could be evaluated.

The next time I teach this course I will pre-draw several of the complicated graphics. I thought I could stick the animals up to explain my point but it took too much time to tape on so many animals. However the use of the cut-out drawings greatly increased the ability to explain the food chain.

3. I would teach the course over a weeks time, within the community. Class time would be a couple of hours a day with some longer lab periods possibly. Each community member would be responsible for their own food. That way the course would be more than just a way to eat for a few days for free.
4. The lists produced from this report should be returned to the community for corrections and additions. These would be used to produce the booklets about the "Habitats de los

animales silvestres de Lomerío". (I am not sure that this should be the title). It would be important to return this information to each of the participants for them to use, work with, add to, and correct.

There are 16 members of the Chiquitano community with at least a preliminary training of wildlife management and game harvest monitoring techniques (the 17 th student cannot write). They have been trained and set loose without any real life experience with taking the notes for real. All the training was done with various imaginary scenes. They did not weigh even one dead animal. For some it seemed a bit difficult at first. They ended up basically copying to fill in the forms. Instead of the forms making it easier, they made it more difficult for some of the students.

That is the reason that forced me to make a new form. This new version of the form should be offered to the 17 students who participated in the first course.

SECTION VII

SUGGESTED RESEARCH PRIORITIES

As a result of the discussions with Damián Rumiz and Daniel Guinart about research possibilities in the BOLFOR project we concluded that several themes were of importance to the field research. These research projects will be performed by Rafael Aguape and Juan Carlos Hurtado. One will be focused on the "Comparison of the abundance and distribution of wildlife food species within two study areas of Lomerío". This study could use statistics to tests for species diversity between the different sites. The distribution could be calculated and shown in maps instead of "nearest neighbor" statistical analysis. Just a comparison of the quantity of fruit trees available would help.

The second research we discussed (for Juan Carlos Hurtado) was a comparison of abundance of wildlife tracks in various (micro?) habitat types. This is interesting and could also be combined with bait sets along the trails and the roads to improve the coverage of larger areas (such as the pampa areas).

A. Several Proposed Research Focuses

"Fruit production by Motacú Palms"

This proposed research would be focused at measuring the fruit production of the Motacú palm tree, a very important food species for most of the wildlife in the Lomerio area. By monitoring the phenology and the number of fruit produced an estimate of production could be modeled to understand the role this tree plays as a limiting factor to the wildlife species in Lomerio.

"Raising wild captured caviés in captivity and their potential for use as a reliable protein source for the Chiquitanos of Lomerío".

Efforts should be made to live capture several pairs of "conejos" from the Lomerio area. These should be placed in pens in Lomerio with the "farmers" as co-investigators (See Appendix XI, notes from the workshop held in Iquitos wildlife management congress). If possible farmers should be taught how to keep their own records. A simplified record taking technique could be developed to report when litters are born, aggression between animals, and feeding. The guinea pigs being raised in the Amazon region of Araracuara, Colombia, probably died from Escherichia coli infection, a product of human contaminated water. Care should be made to boil water before giving it to the animals, or use rain-water.

Co-investigators would not be paid but would be supplied with the place to keep the animals, probably a brick or adobe corral. Although one man said to me that these animals do not dig, it would be wise to set the corral into the ground by about 1/2 meter to prevent hungry dogs etc., from digging in from the outside.

A preliminary survey of the community should be done while the animals are being trapped in the wild. This would be helpful in evaluating the acceptability of this meat into the daily diet of the local people.

The following short questionnaire should be asked of at least 20 adult females and males of each community. The purpose is to learn about the existence of taboo on the animal and whether the meat is appetizing. A structured short questionnaire could be an excellent instrument to measure the acceptability of conejo meat to the general population. Since the questionnaire is very short, there should be no difficulty in getting good replies.

Do you eat conejo?

Do you know anybody who eats conejo?

Can children eat conejo? if not, why not?

Do you like conejo meat?

Mucho, poco, o como? (Try to get a level of palatability with a scaled answer such as: mucho, más o menos)

The same questions could be asked about "peni" or "tapiti" which are sometimes reported as harvested. The possibilities of raising these species in captivity should be investigated also. This short questionnaire could probably be administered by Daniel or Mario. Because it is so short many people could respond in a short period of time.

APPENDIX I

PRIMER CURSILLO SOBRE MANEJO DE FAUNA SILVESTRE DE LOMERIO

JUNIO 22-24, 1995

I Introducción

II Introducción a la Ecología

Definiciones

Medio ambiente: comprende todos los factores no vivos y vivos que determinan la existencia de un organismo.

No vivos: suelo, agua, aire, sol, viento

Vivos: plantas (flora), animales (fauna)

Ecología: estudio de la relación entre los seres vivos y el medio ambiente en que viven. La palabra "ecología" viene de la palabra griega "oikos" que quiere decir "casa".

Ciclo de Energía: es como el flujo de energía (o de agua en un ciclo de agua) corre comenzando del sol hacia un organismo a otro formando un ciclo. En cada escala se pierde un porcentaje de la energía hacia el ambiente.

Cadena Alimenticia: conjunto de relaciones por las cuales un organismo se alimenta de otro y es a su vez comido por un tercero.

Hábitat: lugar donde viven los animales, especialmente relacionado con diferentes clases de vegetación.

III. Manejo de Fauna Silvestre

Definiciones

Manejo: manipular un sistema de producción para producir más

Manejo de Fauna: Manipular la producción y uso de los animales silvestres para que ellos produzcan lo máximo posible y pueda ser cosechada.

Uso sostenible: es un uso que se puede mantener y no acaba el recurso ni disminuye la producción.

Productividad: número de hijos que nacen por cada hembra, o por cada individuo por año (esta es la definición para los animales)

Producción: la cantidad de hijos producidos por año en un área determinada (por ejemplo, en un kilómetro cuadrado (km²) o en una hectárea)

Los animales requieren tres cosas para vivir y producir con éxito

1. Alimento
2. Agua
3. Refugio o vegetación donde esconderse

Incrementando todos o alguno de estos componentes mejorarán las condiciones de vida para ellos y entonces tendrá mayor producción.

Discusión

-) Cuáles son los factores limitantes en Lomerío?
-) Cuáles son las causas de estos factores limitantes?
-) Cómo se podría mejorar el ámbito para los animales silvestres?

Información que se requiere para el manejo de fauna silvestre

Sobre los animales en el monte

-) Cuántos hay? (Densidad - número para una determinada área)
-) Qué comen?
-) Cuántas crías tienen por año?
-) Cuántas veces por año se emparejan?
-) Dónde se los encuentra;) En qué tipo de vegetación habitan?
-) Qué porcentaje de la población son hembras?
-) Cuántas hembras tienen crías cada año?
-) Cuántas crías tienen cada año?
-) Su vida es larga o corta?
-) Cuántos jóvenes, adultos y viejos existen en la población?
-) Qué porcentaje de la población son hembras?
-) Cuántos animales mueren cada año? (Mortalidad)

IV Colección de datos sobre cosecha

V Datos de Cráneos

VI Datos de Fetos

VII Conclusiones

MONTE ALTO *Where the trees are the tallest*

PLANTS	ANIMALS
<p>Curupau Sirari (<u>Peltogyne</u> sp.) Tajibo (<u>Tabebuia</u> spp.) Cuchi (<u>Astronium urundeuva</u>, an indicator species) Bibosi (<u>Ficus</u> spp.) Momoqui (<u>Caesalpinia pluviosa</u>) Garabatá Bejucos Macono Tacuarimbo (<u>Guadua paraguayana</u>) Sumuque (<u>Syagrus sancona</u>) Toco (<u>Enterolobium contortisiliquum</u>) Verdolago Cabeza de mono (<u>Apeiba</u> spp.) Picania negra (<u>Cordia</u> sp.) Morado (<u>Machaerium scleroxylon</u>) Palo Blanco (<u>Calycophyllum multiflorum</u>) Roble (<u>Amburana caerensis</u>) Cedro (<u>Cedrela</u> spp.) Guayabilla Pacobillo Chitiqui (Cabo de Hacha) Soto Paquio abejas Tarara (<u>Centrolobium microchaete</u>) Jichituriqui Chitaiqui</p>	<p>Tatu (<u>Dasyopus novemcinctus</u>) Oso Bandera (<u>Myrmecophaga tridactyla</u>) Tapiti (<u>Sylvilagus brasiliensis</u>) Pava campanilla (<u>Pipile</u>) Tropero (<u>Tayassu pecari</u>) Taitetu (<u>Tayassu tajacu</u>) Anta (<u>Tapirus terrestris</u>) Mono Cotudo (<u>Alouatta</u> sp.) Pejichi (<u>Priodontes maximus</u>) Cuajojo (<u>Tigrisoma lineatum?</u>) Puerco Espin (<u>Coendou prehensilis?</u>) Tejon (<u>Nasua nasua</u>) Aguila (<u>Harpyja harpia</u>) Peta negra (<u>Geochelone carbonaria</u>) Peta amarilla (<u>G. denticulata</u>) Mutun (<u>Crax</u> sp.) Gato montes (<u>Felis pardalis</u>) Gato Brasil (<u>Felis wiedii</u>) Tigre (<u>Felis onca</u>) Boye (<u>Boa constrictor</u>) Surumutuco Abejas señorita bobosi suro cicari oro lambejo parabita sombra sucho (medicine for stomach ache) colmena cortapelo</p>

GUAPASALES

PLANTS	ANIMALS
Guapal	Tropero (<u>Tayassu pecari</u>) Mono 4-ojos (<u>Aotus sp.</u>)

SALITRALES

PLANTS	ANIMALS
Motacu Bibosi Penoco Guapumo	Anta Tropero Taitetu

MOTACUSALES (suelo arenoso)

PLANTS	ANIMALS
Motacú Bibosi Bejuco Bi	Taitetu Tapiti Masi Perico 4-ojos tejon Tropero Anta

PIEDRA

PLANTS	ANIMALS
	Víbora Caracoe Garabati chicho Corechi Peni Jausi Chupa coto Sucha Condor Anta Murciélago

LAJA

PLANTS	ANIMALS
Caoque Espina Una frutica rojita como pastilla de chicle Mitajaya Paquió (al lado) Taruma Piña Brava Mani de Monte Puco	

BARBECHO

PLANTS	ANIMALS
Hierba Cedrillo Ambaibo Totai Curupau (retoño) Cedro (retoño) Motacu Espina	Jochi pintado Jochi calucha Tapiti Mauri (pajaro negro) Penoco Pava campanilla Pava Guaracachi Melero Carachupa Monito (<u>Callithrix argentata</u>) Sepes boye (víbora) Mutun (come fruta de Ambaibo)

CHACO

PLANTS	ANIMALS
Maiz Yuca Mani Piña Caña Camote Zapallo Joco Frejol Papaya Plátano	Urina Huaso (recently gone?) Tapiti Jochi pintado Jochi calucha Tucan Taitetu Tropero (sometimes comes) Zorro Gato gris Peji Martin Loro Chonchone Cuquisa Sebuey Torcasa Cascare Maru Cojuchi Tareche

CASA

PLANTS	ANIMALS
	Murciélago Chupacoto Hurichi Puerco casero Gallina Perro Gato Pato Vaca

RIO

PLANTS	ANIMALS
Bibosi	Londra (<u>Pteronura brasiliensis</u>) Lobo de Agua (<u>Lutra longicaudus</u>) Lagarto Murcupiche Patos Cuajojo Caracoe Martin Pescador Anta Oso bandera (<u>Myrmecophaga</u>) Puma (<u>Felis concolor</u>) Capiguara Peces Benton Surubi Sabalo Sardina Piraña Motocuchi

CURICHE

PLANTS	ANIMALS
	Pava Anta Sapo Saballon Taitetu Turo Garza blanca Anguila Simbao

LAGUNA

PLANTS	ANIMALS
Tarope	Anguila Piraña Patos Capiguara

CHAPARRAL

PLANTS	ANIMALS
Plantas bajas Guaturapus Guapuru Mucho gajo Aqui no se pierde el cultivo de arroz, es plano y bajo	Tropero Taitetu

APPENDIX III

LISTED GAME SPECIES AND THEIR RESPECTIVE FOOD PLANTS

Food plants of Game species

Taitetu

yuca
maíz
garabatá
guapa
retoño de guapa
chuiiri
Tancapé
no come pescado, carne
saballon
salitral
fruta y raíz
Socori

Gato monte

no fruta puro animal

Mismo Gato Brasil

Tigre en la laja

Gato gris

Leon está en el monte alto

Martin found in monte alto

Melero

come miel
papaya
perdiz
plátano
bibosi
bi
pacubillo

Tropero

motacú
plátano
barbecho
pampa monte
todo no carne, pescado
maíz
yuca
bibosi

toco
tarumá

mono 4 ojos

bibosi
penoco
azucaro
pampa monte
concebilla
flor de gallito

Alouatta

mapajo
fruta de penoco
toco
no come hojas
salitral (en la tierra)
fruta de garabata

Loros

chaco
bibosi
maíz
plátano
fruta de algodón

Aguila

come monos
jochi
gallina
víbora

tucan

papaya
barbecho
plátano
fruta
huevo de otros pájaros
Achaicharú
pitón

Anta

encontrado en todas partes
salitral, piedra

bi

motacú

bibosi

azucaro

somoque

paquió

penoco

almendra

hoja de plátano

papaya

mocarú

garabatá

tronco de motacú

Pava coto colorado

bibosi

ambaibo

pitón

motecillo

aguai

papaya

maíz

plátano

Mutun

bibosi

aguai

guapurú

pacobillo

pava campanilla

aguai

sirari

bibosi

flor del tajibo

guapurú

pacobillo

langosta

tucuru

Tinamous

Pampa

chaco

maíz

arroz

tucura

escarban

Pejichi

igual que el peji

gusano

motacú

turiro

Perico

hojas de árboles

flor de toborochi

fruta de bibosi

Oso hormiguero

hormiga

turiro

Tapiti

Barbecho

monte alto

chaco

tapiti en el camino

paja

hoja de maní

lechuga

arroz

hoja del frijol

Huaso

come lo mismo que la urina

Jochi pintado

maíz

salitral

motacú

totaí

bi

paquió

toma agua

sale de noche

Tejon

Bibosi

guapurú

bi
gusanos
Quebrada
chaparral
salitral
plátano
paquió
pacobillo

Peji
anda en todas partes
pampa monte
monte alto
totaí
saballon
curichi
maíz
maní
camote
melea
come algo muerto
bichito
turiro
gusano
quea quema
sipe

Tatu
chaparral
y en todas partes
gusano
saballon
turiro
sepe
no come algo muerto

Corechi
igual motacú

**Tatu hurón, cola blandinga, barbudo
peludo (no identificado).**

Puerco Espin

motacú
hoja de bibosi
isotoubo
totaí
sumuque
monte alto

Jochi calucha

Motacú (El siembra)
yuca
salitral
maíz
bibosi
Tronco de motacu
penoco
toco
paquió
almendra
maní
plátano

Urina

pampa
sirari
totaí
isotoubo
penoco
bibosi
maíz
maní
frejol
hoja de camote
hoja yuca
hoja de plátano
paja sujo
guapurú
taruma
bi