

# Intrinsic Economic Value of Wildlife and Wildlife Preservation: Implementation of sustainable wildlife-economy management (ISWEM) in Latin America

Jim Shockey<sup>1</sup>, J. Thomas Saldias<sup>2</sup>, Juan Francisco Facetti<sup>3</sup>, Michael E. Kjelland<sup>4,5</sup>

<sup>1</sup>Jim Shockey's Hunting Adventures, Victoria, BC, Canada V8V 4Y9

<sup>2</sup>Department of Wildlife and Fisheries Sciences, Texas A&M University, College Station, TX 77843, USA

<sup>3</sup>Universidad Nacional de Asunción, Campus Universitario San Lorenzo, Paraguay

<sup>4</sup>Division of Science & Mathematics, Mayville State University, Mayville, ND 58257, USA

<sup>5</sup>Conservation, Genetics & Biotech, LLC, Valley City, North Dakota, USA

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**\*Corresponding Author:** Michael E. Kjelland, Mayville State University 330 3rd St. NE Mayville, North Dakota, 5825, USA.

## Abstract

Presently, the problem for wildlife in Paraguay (herein used as a case study), and elsewhere in Latin America, is that conservation and management programs are not working as well as they could be. Instead of using legal sport hunting as the tool to protect wildlife, often coined "conservation hunting," which would give a real economic value to the wildlife of Paraguay, it has for the most part been ignored. Habitat loss is the greatest danger to the native wildlife of Paraguay and while "anti-hunting" organizations might seem to be the solution to wildlife population decline, they are in effect accelerating the loss of wildlife by removing its intrinsic economic value, thereby forcing ranchers to seek alternative revenues from their lands resulting in deforestation and habitat destruction. A feasible way for Paraguay to preserve sustainable numbers of many native plants and animals is to apply a sustainable economic model, i.e., a legal hunting industry. In doing so, the Paraguayan government would allow ranchers to create more jobs and revenue by taking sport hunters on guided hunts while simultaneously limiting the alternative revenue stream of deforestation and habitat destruction.

**Keywords:** Latin America; Paraguay; sport hunting; sustainability; wildlife conservation; wildlife management.

## 1. INTRODUCTION

The present assessment was conducted to determine whether the modern model, i.e., Implementation of Sustainable Wildlife-Economy Management Model (ISWEM), could hold potential for a country like Paraguay. ISWEM has been used for managing wildlife populations both economically and sustainably, having been implemented successfully in various African countries (Lindsey et al. 2007), and could be a feasible option for a country like Paraguay.

## 2. BACKGROUND AND PROBLEM OVERVIEW

A serious problem for wildlife in Paraguay, and other countries in Latin America, is that the current conservation and management programs are not working efficiently. Instead of using properly applied legal sport hunting as a tool to protect wildlife, which would give a real economic value to the wildlife of Paraguay, the management of wildlife via sport hunting has essentially been ignored. The future of some species of wildlife in Paraguay is obviously in question as a result. Using projected extrapolations, based on countries in a similar "land clearing" developmental phase, several of Paraguay's native wildlife species will likely fall below sustainable populations numbers within 25 years from now, leading to serious environmental consequences. There are approximately 14 million hectares of forest in the Paraguayan Chaco with much biodiversity (Aguar 2004). In Paraguay, legal sport hunting is not

allowed and therefore puts the wildlife in peril while placing the revenue generated by illegal taking of wildlife in the pockets of poachers and illegal guides, but not into wildlife and habitat conservation programs. Illegal, unmanaged poaching in Paraguay has flourished in the absence of sound scientific management practices, like that of the North American Model of conservation and wildlife management.

Paraguay is in the unique position of having a largely (95%+) privately owned land base (Brooks et al. 1992; (IRDC) 1999). Because of this fact, Paraguay (of all the developing countries in South America and other developing nations) is perhaps the most perfectly suited country for the ISWEM program. The basis for the fore-mentioned statement is because at the present time, ranching and logging are the two predominant economic forces in the country. Wildlife cannot compete as a short-term economic option against ranching and logging, but in fact, wildlife management complements ranching as long term revenue generating activity. Both ranching and logging can be destructive to the environment if they are not conducted in a sustainable way and can result in long term loss of environmental value, as currently is the case taking place in Paraguay. Because ranching and logging can effectively deforest the remaining high and low canopy jungle of Paraguay, two major problems are inevitable if conditions do not change: 1) Paraguay will be black-listed in the world community as a degrader of the environment leading to a lack of respect by potential trading partners, like the USA, that place value on doing business with developing countries that are environmentally responsible, and 2) the wildlife of Paraguay will lose what little is left of the native habitat necessary to sustain viable populations of the majority of the wildlife species native to Paraguay. As a result of this study, we provide feedback and identify a potentially feasible strategy to prevent the further loss of habitat and wildlife in Paraguay and safeguard it for future generations. We ascertain that ISWEM is an appropriate model that has the potential to be utilized in Paraguay. As a result of this research, new legislation was debated in Paraguayan congress with the participation of the stakeholders (e.g., NGO's including SCI and SEAM (Secretaria del Ambiente, i.e., Environmental Secretary)).

### **3. RESULTS AND RECOMMENDATIONS**

Flying over Paraguay, gridding the country to gain an oversight of the present state of the native habitat left in Paraguay, it was immediately evident that Paraguay must do something soon to put a stop to deforestation, or several of the native wildlife species will be extinct in that country. As has happened in the past in developed countries of the world, making sport hunting illegal was considered the way to “preserve” wildlife; a methodology that has proven to be faulty at best and very ineffective at worst, so ineffective in fact that stopping hunting of native wildlife species (i.e. Kenya) has all but caused the decimation of the populations of remaining wildlife species. While “anti-hunting” was previously a popular position, around 20 to 30 years ago, in progressive countries like the USA, it has almost fallen completely out of favor since that time, largely since “anti-hunting” is the worst position a government can take in terms of increasing or even sustaining native wildlife populations. By removing the economic value of legally hunted species, potential conservation funds generated from the activity are also lost, i.e., a foregone benefit is a cost. The most important element of ISWEM that we emphasize is that not one single species that is managed under sport hunting is endangered (although it may have been previously) or has populations that have dwindled; on the contrary, these populations are healthy, sustainable and often times even growing (Saldias 2009). For example, though elephant hunting has been banned for a 30-year period in Kenya, poaching has not been significantly reduced. It is safe to say that the percentage of poaching profits that goes to fund conservation efforts is about zero. Even though Kenya has many national parks and reserves protecting wildlife, elephant populations are still at risk, in part due to corruption and some officials supplementing their incomes by permitting poaching (Anderson & Grove 1990).

Trophy hunting, purely as sport and as a conservation action is now being considered for adoption in Kenya, as it appears to have yielded positive results in Namibia and South Africa under a community managed conservation program titled “Community Based Natural Resource Management (CBNRM)”. Under CBNRM, cash was offered as an incentive for sport hunting with the basic aim of wildlife control on the communal land for providing benefits to the community as a whole (Smith 2007). The CBNRM is a sustainable use equals sustainable benefits approach. Upon preliminary observation, it seems that people in the positions of power, in both the public and private sectors in Paraguay, appear to be uninformed or apathetic in terms of modern perspectives on wildlife management. To our knowledge,

there is very little scientific information regarding modern wildlife management and preservation practices being disseminated by Non-Governmental Organization officials as to the actual status of the wildlife in Paraguay; largely it seems because wildlife studies based on sound scientific practice are few and far between. We by no means imply that Paraguay is alone in terms of needing to change its approach in wildlife management and conservation practices; there are other countries in Latin America where a paradigm shift in conservation approaches might be applied, e.g., Peru. In fact, we challenge the reader to find scientific peer-reviewed articles focusing on the issues that we present herein for the geographic region of Latin America. Therefore, with a lack of literature and a seemingly disinterest by many Wildlife Biologists and Ecologists in discussing such a provocative issue, the authors of the present manuscript have decided to put forth our ideas, based on our observations, with the hopes that a platform for further discussion and analysis can be established.

Although hunting is not legal in Paraguay, time after time during the duration of the time spent in Paraguay (June, 2010 and May, 2011), widespread availability of native wildlife species such as tapir (*Tapirus terrestris*), anteater (*Myrmecophaga sp.*), paca (*Agouti paca*), aguti (*Aguti baya*), brocket deer (*Mazama sp.*), pampas deer (*Ozotoceros bezoarcticus*) and marsh deer (*Blastocerus dichotomus*) were witnessed as being available for sale as “bush meat” in local markets. Not once during this study was a single attempt witnessed to curtail through law enforcement, the loss of native species, even though these species were flaunted as being “for sale” along roadways and travel corridors. Although on the surface it seems that the government powers have taken a position of “what we do not know or see officially does not exist.” In reality, it is apparent that the government does not have the funding or allocated resources to carry out investigations of poaching, marketing of wildlife, killing of native wildlife, nor does the government have funding for consistently pursuing the perpetrators of this wanton waste of Paraguay’s native wildlife.

In short, the environmental authority needs revenue, generated by the wildlife of Paraguay, to be able to protect the wildlife of Paraguay. By the end of the two primary study periods, it was amply evident that the only way Paraguay is going to appreciably preserve sustainable numbers of many native plant and animal species, is by applying ISWEM.

### **3.1. Economic Benefits to Paraguay**

Due to the favorable prices of commodities, currently, ranching is a very profitable business in Paraguay. Even ranches that formerly were marginal in terms of economic viability are now profitable – provided that the forest within that ranch’s boundaries is cleared to make way for non-native grasses such as Tanzania grass. When the forest is cleared, habitat loss is the net result for the native wildlife species. Ranchers are required to meet certain guidelines in terms of how much land, on a percentage basis, they can legally clear within their boundaries. They are required to keep 25% of natural forest overall (Ley 422/1973. Ley Forestal de Paraguay), and while on the surface this might seem to be a working model to sustain wildlife populations, it is not. The land is cleared in ways that effectively isolate pockets of remaining forest land, effectively “land locking” the forest species in “islands” or “patches” of native habitat that are too small to maintain viable breeding populations. There is no native habitat connectivity or “corridors” between native forest tracts of habitat. It has proven impossible in every developing country in the world to hold back the forces of economic progress. Increasing numbers of people means a country must generate more revenue, and in the case of Paraguay the only feasible way a rancher can presently generate more revenue on their land base leads to deforestation of the native habitat.

### **3.2. An Alternative Called ISWEM**

By legalizing hunting, the Paraguayan government would effectively allow the ranchers to create more jobs and generate revenue by taking international hunters on guided hunts. This is a method that has been shown to conserve and protect wildlife in developing countries such as Tanzania, South Africa (Lindsey et al. 2007; Pretorius 2011), Botswana, Iran, Kyrgystan, Mongolia; and many others. It is also the management tool that has been most effective in conserving native wildlife species in developed countries like the USA and Canada (Geist et al. 2001; Mahoney et al. 2008). Legalized sport hunting is the most viable option open to the government of Paraguay, if there truly is a will to preserve wildlife species and habitat. After interviewing many landowners and ranchers in Paraguay, it was determined that there is a strong awareness of the habitat loss that cattle ranching is causing, in effect destroying the wildlife populations of Paraguay. In these many interviews, it was also determined that nearly all

the ranchers interviewed feel badly about destroying this natural treasure of Paraguay, and all of those ranchers would welcome an alternative way to generate revenue, if there was some way to compensate them for the loss of revenue, they would incur by not clearing the land. The will of these landowners is there to preserve wildlife, but the application of the appropriate method is what is lacking.

Right now, based on the observations from this study, the timing is perfect for the government of Paraguay to legalize sport hunting for native species, thereby opening up the only alternative revenue stream to ranchers and thereby curtailing the loss of native habitat. The process is simple and easy to put into practice in a relatively short timeframe, an estimated two to five years for a fully implemented program. The first step is to bring in specialists in the field of ISWEM to help assist in legalizing hunting. Allow the experts to determine the viability of such a revenue generating program for the ranchers. One of the authors of this study, Jim Shockey, has worked extensively with the native Aleuts of the Aleutian Islands (off the coast of Alaska) to implement a hugely successful “outfitting” program. He has also been working with the government of Peru, to explore the possibility of such a program in that country to address the issues of habitat loss and wildlife preservation.

Upon initial investigation of the situation in Paraguay, we believe that if hunting were legalized, the natural extension of such an occurrence would be the immediate development of an entire “industry”. Ranchers would be able to easily sell outfitted hunts to international hunters eager to venture to Paraguay to hunt the native species on the ranches, thereby saving habitat for these animals. With the proper harvest quotas in place, sport hunting would have a minimal impact on the actual populations, likely allowing certain species to increase their numbers. How can this be? By providing an economic value to the species, there is an incentive to the stakeholders to manage and conserve those individuals and their habitat. The immediate need is for an additional study to provide further recommendations to the government as to the possible outline of such a hunting industry. Sport hunting is tightly regulated and controlled in all countries where it is legal, and ISWEM has proven to be the only effective way to protect the wildlife species in dozens of countries around the world. Establishing the legal framework to create this kind of industry, means bringing together private and public, local and foreign potential funding sources to invest in the research needed to implement the procedures undertaken by other successful countries that were in a similar situation in the past, e.g., United States, South Africa, Namibia, Tanzania, Mexico, and others.

### **3.3. ISWEM - The Actual Process**

Second, for sport hunting to be legalized, a system for purchasing sport hunting licenses and tags would need to be implemented. The number of licenses (essentially the number of sport hunters allowed into Paraguay) would initially need to be small while a pilot study is conducted and harvest data are gathered and populations monitored. This is so to make sure hunter success and rancher capabilities, balanced with the number of individuals of given species allotted for harvest, allow for the maintenance of stable populations. This is especially the case for flagship species, such as tapir (*Tapirus terrestris*); it is best to be on the conservative side where quotas are concerned and to maximize the demand vs. supply equation. Population viability studies would need to be implemented (at the expense of each individual rancher interested in implementing an outfitting operation on their land) to determine “population viability and numbers”, much like the operational model of Mexico.

ISWEM is a self-balancing model, where the ranchers are preserving native forest and wildlife, and are being paid to do so. The ranchers, upon realizing that they are actually generating more revenue from wildlife-related hunting, will likely work harder to recover more native habitat, and ultimately produce more native wildlife, which in return produces more revenue. For example, using such a model in South Africa caused an increase in game animal species’ populations from 500,000 to 18.6 Million individuals (Pretorius 2011). In yet another example, the sport hunting of the endangered Bighorn sheep over the last 15 years through The Foundation for North American Wild Sheep (FNAW) permit programs has raised many millions of dollars for sheep conservation helping to create a four-fold increase in the number of wild sheep in North America (Living on Earth 2006).

### **3.4. ISWEM - potential revenues for ranchers and government**

Upon implementation of ISWEM, revenue streams go to both the ranchers and to the government. License and tag fees from sport hunters are paid directly to the government. At the present time, the

Paraguay government is funded by one of the lowest taxation models in the entire developing world and any revenues generated by foreign funding would be a welcome and necessary revenue stream. Because the wildlife species in Paraguay are so unique in the world of sport hunting, and because the Paraguay government has an opportunity to be one of the first South American countries to legalize sport hunting, the revenue generated from sport hunting would be significant, easily over \$1 million US dollars initially, with as few as 50 international hunters allowed into the country and with time, and could generate as much as \$10 million US dollars annually. Ranchers would benefit more than the fore-mentioned dollar amount, perhaps by a factor of 2X. With as few as 50 international hunters entering Paraguay, ranchers might generate over \$2 million US dollars for doing little more than they presently do, except that they would be generating dollars from what is presently considered as “dead” un-cleared land. As the ranchers receive such large cash inputs to their ranching operations, they might then be inclined to dig waterholes, which would greatly increase the survivability of many species, including the more common species that are “water” reliant, like brocket deer, capybara and tapir. The above numbers do not take into account the possibility of ranchers being able to outfit foreign hunters for the true flagship species in Paraguay, like pampas deer (*Ozotoceros bezoarticus*), marsh deer (*Blastocerus dichotomus*), ocelot (*Leopardus pardalis*) and jaguar (*Panthera onca*), but should those species become available to hunters, the numbers above could quickly triple, to \$30 million US dollars, revenue that would go directly to the Paraguay government for further wildlife management and conservation activities.

The most important economic point of all is that studies have shown that the dollars brought into a country where sport hunting has been implemented as a conservation and wildlife management tool, are actually generating 10x the dollar amount in “spin off” spending (e.g., hotels, food, entertainment, purchases, travel, etc.). The net economic impact to Paraguay, with a fully operational hunting industry, could be tens of millions of dollars annually. In comparison, countries like Argentina, Mexico, Spain and South Africa generated an impact of \$300 million US dollars in 2005 (Sullivan 2005); \$150 million US dollars in 2007 (Migliorini 2008) \$ 3.6 billion US dollars in 2007 (Bernard Danzberger 2008), and about \$250 million US dollars (Pretorius 2011), respectively (Saldias 2009). Meanwhile, countries like Mexico and Spain reported the generation of 43,685 direct jobs in 2002 (SEMARNAT, ANGADI et al. 2005) and 36,000 direct jobs in 2007 (Bernard Danzberger 2008), respectively.

**Table 1.** Animal species that are not listed in any of the Appendices of CITES.

Spanish Name	Scientific Name	Guarani Name
Tatu Bolita	<i>Tolypeutes matacus</i>	Quirquincho bola
Tatu Hu	<i>Dasypus novemcinctus</i>	Armadillo mulita grande
Oso Melero	<i>Tamandua tetradactyla</i>	Kaguare
Zorrino	<i>Conepatus chinga</i>	Jaguane
Huron mayor	<i>Eira barbara</i>	Eira moro
Huron	<i>Calictis cuja</i>	Huronpe'i
Coati	<i>Nasua nasua</i>	Koati
Osito lavador	<i>Procyon cancrivivus</i>	Aguara pope
Corzuela roja	<i>Mazama americana</i>	Guasu pyta
Corzuela parda	<i>Mazama gouazoupira</i>	Guasu vira
Corzuela rojiza	<i>Mazama nana</i>	Guasu pyta'i
Coendu grande	<i>Coendou prehensilis</i>	Kui'i guasu
Carpincho	<i>Hydrochaeris hydrochaeris</i>	Capi'i yva
Aguti bayo	<i>Dasyprocta azarae</i>	Akuti say'ju
Paca	<i>Agouti paca</i>	Akutipac
Nutria	<i>Myocastor coypus</i>	Kyja

**Table 2.** Animal species that are listed under the Appendix II of CITES II.

Spanish Name	Scientific Name	Guarani Name
Oso Hormiguero	<i>Myrmecophaga tridactyla</i>	Jurumi
Zorro	<i>Cerdocyon thous</i>	Aguara'i
Lobo de crin	<i>Chrysocyon brachyurus</i>	Aguara guasu
Yaguarundi	<i>Herpailurus yagouarondi</i>	Mbarakaja Eira
Gato de pajonal	<i>Oncifelis colocolo</i>	Mbaracaja tirika
Puma	<i>Puma concolor</i>	Jagua pyta
Pecari labio gande	<i>Tayassu pecari</i>	Tanykati
Guanaco	<i>Lama guanicoe</i>	Guasu kaka

**Table 3.** Bird species that are not listed under any of the Appendices of CITES.

<b>Spanish Name</b>	<b>Scientific Name</b>
Ano grande	<i>Crotophaga major</i>
Bandurria	<i>Theristicus caudatus</i>
Brasita de fuego	<i>Coryphospingus cucullatus</i>
Buitre real	<i>Sarcoramphus papa</i>
Caballerizo	<i>Machetornis rixosus</i>
Carau	<i>Aramus guarauna</i>
Celestino	<i>Thraupis sayaca</i>
Chaja	<i>Chauna torquata</i>
Cigüeña	<i>Ciconia maguari</i>
Cuervillo cara pelada	<i>Phimosus infuscatus</i>
Espatula rosada	<i>Ajaia ajaja</i>
Federal	<i>Amblyramphus holoseriseus</i>
Feugurero	<i>Piranga flava</i>
Galineta negruzca	<i>Pardirallus nigricans</i>
Garcita blanca	<i>Egretta thula</i>
Garza blanca	<i>Casmerodius albus</i>
Garza bruja	<i>Nycticorax nycticorax</i>
Garza mora	<i>Ardea cocoi</i>
Garza silbadora	<i>Syrigma sibilatrix</i>
Jacuna	<i>Jacana jacana</i>
Jacutoro	<i>Jaku toro</i>
Martin pescador grande	<i>Ceryle torquata</i>
Martin pescador mediano	<i>Chloroceryle amazona</i>
Monjita blanca	<i>Xolmis irupero</i>
Pajaro campana	<i>Procnias nudicollis</i>
Pava de monte	<i>Penelope obscura</i>
Pava de monte chica	<i>Penelope supercilialis</i>
Pava pintada	<i>Crax fasciolate</i>
Pecho amarillo	<i>Pseudoleistes guirahuro</i>
Pirirta	<i>Guira guira</i>
Polla azul	<i>Porphyryla martinica</i>
Polla negra	<i>Gallinula choropus</i>
Sai azul	<i>Dacnis cayana</i>
Saria patas rojas	<i>Cariama cristata</i>
Tangara bonito	<i>Chlorophonia cyanea</i>
Tero tero	<i>Vanellus chilensis</i>
Tijereta	<i>Tyrannus savana</i>
Tucan pecho rojo	<i>Ramphastos dicolorus</i>
Tuere chico	<i>Tityra inquisitor</i>
Tuyuyu	<i>Mycteria americana</i>
Urraca	<i>Cyanocorax chrysops</i>

**Table 4.** Bird species that are listed under the Appendix II of CITES.

<b>Spanish Name</b>	<b>Scientific Name</b>
Carancho	<i>Caracara plancus</i>
Cardenal	<i>Paroaria coronata</i>
Cardenilla	<i>Paroaria capitata</i>
Chiripepe cabeza verde	<i>Pyrrhura frontalis</i>
Cotorrita	<i>Myiopsitta monachus</i>
Loro hablador	<i>Amazona aestiva</i>
Maracana ala roja	<i>Aratinga leucophthalmus</i>
Nanday	<i>Nandayus nenday</i>
Papagayo amarillo	<i>Ara ararauna</i>
Papagayo rojo	<i>Ara chloropterus</i>
Tucan grande	<i>Ramphastos toco</i>

#### **4. DISCUSSION AND CONCLUSION**

Before ISWEM can be applied, further scientific study is necessary and vital. There is a need for a more comprehensive study that encompasses the entire country and inter-related species in different geographical areas. Species that should be focused on in a future study are listed in Tables 1 - 4.

It should be noted that this study did not include any animals that are listed in Appendix I of CITES, although a few species that are listed in Appendix II of CITES were included. Also, for this study export permits for all the individual species listed under the Appendix II of CITES were issued. The importance of “export permits” for these animals is vital to the core of a sport hunting/outfitting industry. If foreign hunters cannot export their animals hunted in Paraguay, ISWEM will be impossible to implement.

Presently, the conservation hunting debate continues and the SCI chapter is now the Paraguayan National Hunters Association (PNHA). The PNHA is working with the Ministry of the Environment to open new hunting seasons for local species.

Paraguay is in the unique position of being the “first to market” sport hunting opportunities for native game in South America. Argentina is presently the only country in South America offering wide scale legal sport hunting, and that is primarily for exotic species that are available elsewhere in the world for less expense to the international hunters. Properly implemented, a sport hunting industry in Paraguay could thrive and offer alternatives to the ranchers who presently are forced to clear virgin forest land to make way for more cattle ranching. It is important to mention that in other countries like South Africa (Pretorius 2011), game ranching produces better returns than livestock/ha on marginal land.

Habitat loss is the greatest danger to the native wildlife species in Paraguay and while “anti-hunting” organizations and beliefs might seem to be the solution to wildlife population decline, they in effect accelerate the loss of wildlife, by removing the intrinsic economic value of wildlife thereby forcing ranchers to seek revenue from their lands through deforestation. Paraguay must do something to curtail the illegal killing and selling of wildlife and implementing a sustainable economic model for a hunting industry can be a feasible solution.

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