Chacoan Peccary *Catagonus wagneri* conservation strategy

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Summary

The Chacoan peccary (*Catagonus wagneri*), an endemic species of the Gran Chaco ecoregion, is endangered of extinction due mainly to habitat loss and hunting. The only conservation plan for the species was written in 1993. Because the situation continues deteriorating, and the rate of deforestation in the region is currently among the highest in the world, the IUCN SSC Peccary Specialist group saw the need to develop a new conservation strategy. A workshop was held in Paraguay, in March 2016, with representatives of different sectors and range countries. This paper presents a summary of the problems, threats and actions identified by the participants. The other two results of the workshop, a species distribution and population viability modeling, are presented separately in this same newsletter issue.

Introduction

The Chacoan peccary (*Catagonus wagneri*) or Taguá, as it is called in Paraguay, is an endemic and endangered species that inhabits the thorn forests of the Gran Chaco of Bolivia, Paraguay, and Argentina. The Gran Chaco is the second largest eco-region in South America after the Amazonia. The species is listed as endangered by the IUCN Red List and in CITES I Appendix (IUCN 2016). In 1993, the entire Chacoan peccary population was estimated to be less than 5000 individuals (Taber, 1991 et al. 1993, 1994) and it has been declining since then (Altrichter & Boaglio, 2004). The situation for the Chacoan Peccary keeps deteriorating, primarily because of habitat destruction and over-hunting. Surprisingly, there is scarce knowledge on the species ecology and current conservation situation. The Gran Chaco was until recently little developed, covered by forest and inhabited by colonists and natives living on a subsistence economy. However, recent economic changes have greatly boosted the export of natural resources and agriculture production. Large areas of forest are being replaced with intensive ranching and agriculture (Huang, et al. 2009; Cardozo, et al. 2014; Caldas, et al. 2015). These trends, in addition to the already unsustainable subsistence hunting that occurs in the region (Altrichter & Boaglio, 2004), represent a major threat to the survival of the Chacoan peccary.

Despite the importance and critical situation of this species, little is being done for its protection. The last, and only, conservation plan for the species was written more than 20 years ago (Taber, et al. 1993). For this reason, the IUCN SSC Peccary Specialist group (PSG) considered imperative to review the species general status and design a conservation strategy including main stakeholders (government, NGOs, researchers, local people, among others). This strategy followed the Population Habitat Viability Assessment model which includes the participatory

creation of an action plan following the IUCN species conservation planning guidelines as well as habitat suitability and population viability modeling. The PSG organized a workshop in Asuncion, Paraguay, with the following objectives: compile available information on the species, analyze its conservation status, identify main threats, and define actions to stop or reverse those threats. This article presents a summary of the Species Conservation Strategy, including only the goals and actions identified as necessary and feasible to stop or reverse the main threats to the conservation of the species.

Methods

Thirty one representatives from Argentina, Paraguay and Bolivia, representing various institutions, met from February 29th to March 3rd at a hotel in Asuncion, Paraguay (Appendix 1). The first day, most of the researchers and people with knowledge on the species worked on reviewing the species status and distribution, and building a population viability and habitat suitability analysis. The remaining three days, participants, including government officials, representatives of the local indigenous communities or Mennonite communities and NGOs, worked on identifying a vision for the plan and the main species threats. Participants were then separated in groups to work on isolating problems and determining goals and actions to address the identified main threats: hunting, habitat loss and lack of knowledge. The third group also worked on reviewing and identifying actions for the potential roles for captive breeding programs. During these three days the population viability and habitat suitability analysis were perfected and tested with the input of the group. Other result of this event was the creation of a network of professionals and institutions committed to put into practice all the recommendations and necessary actions listed as priorities. This article presents the vision of the conservation strategy and a summary of the goals and actions determined by each of the four groups. In the Conservation plan each action is described in detail as well as the person responsible and an estimated time frame to realize the action was proposed.

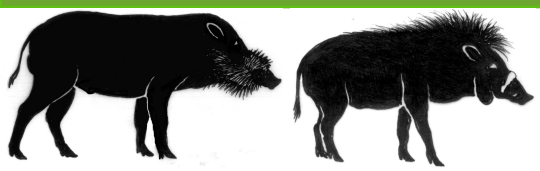
Results

VISION: To ensure viable populations of Catagonus wagneri in the Chaco eco-region, maintaining the ecological integrity and connectivity throughout its distribution, within a context of sustainable and transparent development that contemplates the needs and visions of the local communities, valuing the species as emblematic.

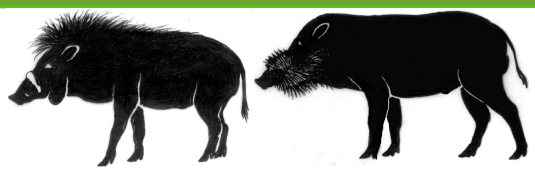
Identified threats, goals and actions

1) Summary results for Working Group 1: Hunting

Participants: Rosa Leny Cuellar, Kaa-Iya Foundation, Bolivia; Ivanna Ghione, PRODERI (Programa Desarrollo Rural Incluyente), Production Ministry, Misión Nueva Pompeya, Chaco, Argentina; Diego Jiménez, Environment Agency, Wildlife office, Paraguay; Timoteo Navarrete, chief Wichi community, Nueva Población, Chaco, Argentina; Nora Neris, Environment Agency, National University, Asunción, Paraguay; Pablo Perovic, National Parks Administration, Salta, Argentina; Silvia Saldivar, Itaipú Binational, Paraguay; Licindo Tebez, local farmer, participant of wildlife monitoring program, Chaco, Argentina.



Chacoan Peccary



Problem

Hunting of Chacoan peccary is illegal in the three countries, although subsistence hunting practiced by indigenous peoples in Paraguay is exempt. However, throughout the species distribution there is prominent illegal hunting for consumption, and in the case of Bolivia and Paraguay, there is commercialization of its meat and hide. In Argentina there is no information if such type of market exists. High hunting pressure can decrease number of individuals, produce changes in the behavior and force animals to change territories. The stress generated under these conditions s also affects the capacity to survive and reproduce.

Five types of hunting were identified: illegal hunting practiced by people from towns and cities; sport or recreational hunting, which is illegal expect for hunting clubs in Bolivia under regulations; subsistence hunting, practiced by local rural and indigenous people to supplement their diet; accidental, produced by roads collisions; pet trade, which is not common but it occurs, generally when the mothers are killed for food; commercial, for meat and pelt trade.

Goals	Actions
All responsible institutions for hunting control operate efficiently and in a coordinated way	Develop training courses on the conservation situation of the species.
The species is considered emblematic of Chaco conservation	Develop educational campaigns in communities and schools about the species importance and hunting regulations. Promote the use of the species as emblematic of the Chaco ecosystem. Contribute to develop coordinated hunting control efforts.
The local communities care about the species and its habitat	Develop a community based monitoring program of subsistence hunting and biological data.
The species is considered under the maximum level of protection	Petition the local governments to consider maximum level of protection.
The action plan is validated and used to inform local laws and regulations	Promote the use of the conservation plan by the local governments to inform laws and regulations.
The number of dogs is reduced to the minimum necessary	Perform education programs including workshops, talks, flyers, etc., about responsible ownership of dogs and dogs' impact on wildlife. Monitor dog population.
There is a current and up to date registration of captive Taguas	Identify and register all individuals in captivity in public and private collections.
There is no illegal hunting	Design a program to educate and inform local people and sport hunters about hunting regulations and sanctions. Promote alternative sustainable economic livelihoods, i.e. promote tourism.
There is no mortality of Tagua due to pet trade, commercialization and accidents	Identify areas of critical road mortality. Increase awareness of illegal pet trade and ownership.

2) Summary results for Working Group 2: Habitat loss

Participants: Daniel Brooks, Houston Natural Science Museum, US; Hugo Correa, principal technician, Quimilero project, Edge ZSL, Chaco, Argentina; Julieta Decarre, Biological Resources Institute, INTA Castelar, Argentina; Anthony Giordano, SPECIES, US; Rosalía Goerzen, Fernheim Cooperative, Filadelfia, Paraguay; Daniel Jaimes, local farmer, member of Mesa de Organizaciones 10 de Marzo, Impenetrable, Technician Proyecto Quimilero, Chaco, Argentina; Julio Monguillot, director Norwest regional office, National Park Administration, Salta, Argentina; Viviana Rojas, Guyra Paraguay, Asunción, Paraguay; Ricardo Torres, Zoology Museum, National University, Córdoba, Argentina.

Problem

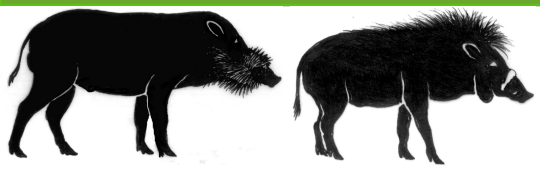
Conversion of natural vegetation to systems of intensive agricultural and livestock, or for mining operations, represents the main cause of habitat loss at a global level. In the Chaco region, the situation among the countries is similar but with particularities depending on the main economic activities. In general, large extensions of natural environment are being replaced by a matrix of productive activities, which implies not only the loss of habitat but also its fragmentation, which represents the major problem for conservation of wild species. The causes can be understood at different scales. At a global scale, the following causes were identified: climate change, together with bio-technology advancements, and a recent increase in the demand of agricultural mining and forestry resources. At national and regional levels the following causes were identified: legal deficiencies, lack of coordination among environmental regulations, lack of control, unclear land property rights, lack of coordination among main stakeholders, unrecognized value of forests and their ecological services, development policies that do not consider the environment, and overestimation of productive potential of the Chaco. All these lead to changes in land use, advancement of urbanization, and expansion of infrastructure, which in turns lead to habitat fragmentation and decrease of Tagua populations.

Participants of the workshop. Photo: E. Ortiz

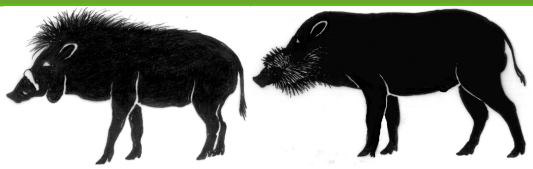
Goals	Actions
The value of the Chaco ecosystem, its resources and services, is recognized.	Implement environmental education through graphic informative material, talks and presentations at schools. Petition the incorporation of the issues of conservation and habitat loss into the official curricula of the schools that are located in the species range. Promote and perform studies on the Chaco ecosystem services. Identify areas of special conservation importance.
There is interaction and consensus among relevant actors (government, research institutions, NGOs, etc.)	Develop workshops for the exchange of information and experience among different actor that are key in the conservation of the Chaco. Promote sustainable alternatives of forest management and livestock. Promote exchange of ideas and information between academic and productive sectors. Produce multimedia material to promote the importance of the conservation of the species. Promote environmental education programs in the Mennonite communities' schools.
Regulations are improved and design to be locally appropriate and coordinated among the three countries	Contribute to improve existent laws and regulation that deal with sustainable practices in the Chaco region.
New protected areas are created and the existent ones are consolidated	To perform a diagnosis of the situation of protected areas within the species range. Promote monitoring programs. Evaluate possible programs for payments for environmental services.
Count with alternative methods to facilitate the titling of land for local people within the species range	Facilitate tilting for local people, especially surrounding the Impenetrable NP

3) Summary results for Working Group 3: Lack of information

Participants: Mariana Altrichter, Prescott College, Co-chair IUCN Peccary Specialist group; Micaela Camino, Landscape Ecology and environment, National University of Buenos Aires; EDGE – SZL, CONICET, Argentina; Juan Campos, Chaco Center for Conservation and Research (CCCI), Paraguay; Jeffrey Thompson, Associate researcher Guyra Paraguay; Laura Villalba, Species conservation program WCS, Paraguay; Kathe Waltbtunner, local member of Colonia Neuland, Paraguay; Andrea Weiller, director of Biology school, National University of Asunción, Paraguay.



Chacoan Peccary



Problem

It is necessary to have more biological and ecological information of the species in order to better understand the species requirements, analyze the viability of the population and estimate abundance and density. The information about individuals in captivity has not been systematized or analyzed, and the information on wild populations is scarce and not current.

Goals	Actions
There is biological information obtained from animals in captivity	Compile and analyze existent information of captive individuals in South America, Europe and US zoos.
There is a standardized system for monitoring the species and its habitat use	Design a locally based program to monitor the species. Design an identification field guide to identify the different peccary species.
There is a data base with all relevant publications	Compile all available published and no published papers
We count with information on the distribution of populations, habitat and functional connectivity	Implement studies focused on understanding the species distribution at different spatial scales and identifying the variables of importance that are associated with the presence of the species. Design sampling methods for genetic analysis.
There is information about socio-economic value of the species and the different perceptions of stakeholders	Design and implement studies to know perceptions and the use of the species in the local communities.
There is a pilot program of environmental education that is available to local stakeholders	Evaluate different forms of education and dissemination of information about the importance of the species and its conservation in the local areas. Compile existing informative documents made by institutions such as zoos in San Diego. Make educational documents in German to be distributed among Mennonite communities.
There are standardized protocols for radio telemetry studies	Test the use of radio telemetry in animals in captivity. Compile and analyze existent information from zoos and other institutions that hold animals in captivity (CCCI, Itaipú, European and US zoos).
The research priorities identified are available at the higher education institutions to encourage research on these topics (CONICET, CONACIT, Universities, etc.)	Promote research priorities among universities and other research institutions.
There is information on ecological and biological parameters	Compile and analyze existent information about the biology of the species collected by institutions that hold animals in captivity. Perform studies on the ecological role of the species.

4) Summary results for Working Group 4: Ex situ conservation

Participants: Mariana Altrichter, Prescott College, Co-chair IUCN Peccary Specialist group; Micaela Camino, Landscape Ecology and environment, National University of Buenos Aires; EDGE – SZL, CONICET, Argentina; Juan Campos, Chaco Center for Conservation and Research (CCCI), Paraguay; Jeffrey Thompson, Associate researcher Guyra Paraguay; Laura Villalba, Species conservation program WCS, Paraguay; Kathe Waltbtunner, local member of Colonia Neuland, Paraguay; Andrea Weiller, director of Biology school, National University of Asunción, Paraguay.

Problem

Land use changes in the Tagua range represent a high threat to the conservation of the species. Protected areas are scarce and these do not provide necessary conditions for the survival of the species. For all these reasons, it considered important to count with a captive breeding program that complements in situ conservation and that allows a safeguard for the genetic diversity of the species.

This group reviewed the main functions or potential roles of ex situ conservation. The identified functions were: 1) Ensure the existence of individuals of the species, 2) provide individuals for restoration of wild populations (reintroductions, translocations, etc.), 3) research and training, 4) environmental education.

Goals	Actions
Count with a standardized protocol for captive management	Create a protocol for captive breeding.
Captive breeding centers provide obtain and provide biological information on the species	Facilitate research on biological parameters at captive breeding centers.
There is current genetic information on captive individuals in Paraguay	Perform a genetic study of captive individuals in CCCI.
There is a collaborative system among captive breeding centers, the IUCN Specialist group and CCCI	Consolidate collaborating among the different centers that hold individuals in captivity and the specialist group.
Count with information on the need to expand the current system of ex situ conservation	Evaluate the need to expand ex situ conservation.
CCCI Works as a key center for educational activities about the species	Develop a program and plan for environmental education at the CCI facilities.

Conclusion

Reviewing he species status in the three range countries, and identifying the main threats, it became clear that the populations are fragmented and populations are declining. It also became apparent that there is need for more research, especially dealing with basic ecological and biological parameters. It was also identified the need to coordinate with local and international captive breeding centers, which can help not only by providing individuals for potential reintroductions, but also by facilitating research and sharing information on the biology of the species.

The decline in the range and numbers of Chacoan Peccary is due to a combination of factors. The workshop participants agreed that more recently, habitat destruction has become the most concerning factor. The rate of clearance for agriculture and cattle pasture in the Paraguayan and Argentinean Chaco is extremely high (Cardozo et al. 2016). This situation, combined with hunting, pose a major threat as habitat loss and high mortality can only lead to an increasing likelihood of extinction.

We recognized that many underlying causes of these major challenges are unsurmountable and beyond our capacities to address. However, we do believe that we can make positive changes and increase the chances of survival for the species and for the Chaco ecological integrity. We trust that the governments of the three range countries will incorporate our results in their planning process as these are based on the best available scientific research and created by a representative group of stakeholders.

Acknowledgements

The workshop was organized and planned by Mariana Altrichter, Harald Beck, Alberto Yanosky, Arnaud Desbiez, and Juan Campos. Kristin Leus (Copenhagen Zoo, CBSG Europe) and Katia Ferraz (Wildlife Ecology, Management and Conservation Lab (LEMaC, Forest Science Department - ESALQ/USP) led the population viability and habitat suitability analysis. Arnaud Desbiez facilitated the workshop. Micaela Camino, member of GEPAMA, UBA, CONICET and EDGE, helped in the organization of the workshop. Mark Stanley, chair of the IUCN SSC Sub-Committee for Species Conservation Planning provided constant encouragement and support. The staff of the NGO Guyra Paraguay, especially Irene Gauto, took care of all the logistical details; they enabled the workshop to run effortlessly and provided the participants with a wonderful stay at the hotel Quinta Ykua Sati with incredible food. This workshop was possible due to the generous contribution of the Mohamed bin Zayed Species Conservation Fund, the IUCN SSC sub-committee for Species Conservation planning, the IUCN SSC Conservation Breeding Specialist Group, World Land Trust, the Paraguay Secretaría del Ambiente (SEAM) and Copenhagen Zoo.

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Appendix 1. Workshop participants

NAME	INSTITUTION	COUNTRY
Mariana Altrichter	Prescott College, Co-chair UICN Grupo de Especialistas en Pecaríes	USA
Rocío Barreto	Secretaria del Ambiente, Dirección de Vida Silvestre	Paraguay
Evelyn Britez	Guyra Paraguay	Paraguay
Daniel Brooks	Curador de la sección Zoología del Museo de Ciencias Naturales de Houston, Houston, Texas	USA
Micaela Camino	Grupo de Ecología de Paisaje y Medio Ambiente, GEPAMA, UBA, CONICET	Argentina
Juan Manuel Campos Krauer	Centro Chaqueño para la Conservación y la Investigación (CCCI)	Paraguay
Hugo Correa	Técnico Principal Proyecto Quimilero	Argentina
Rosa L. Cuellar	Fundación Kaa Iya	Bolivia
Julieta Decarre	Biodiversidad, Ecología y Gestión Ambiental en Agroecosistemas. Instituto de Recursos Biológicos, CIRN, INTA	Argentina
Arnaud Desbiez	UICN SSC CBSG Brasil, Real Sociedad Zoológica de Escocia, RZSS	Brasil
Katia Ferraz	Laboratorio de Ecologia, Manejo e Conservação de Fauna Silvestre (LEMaC), Departamento de Ciências Florestais, ESALQ, Universidad de San Pablo	Brasil
Ivana Ghione	PRODERI, Ministerio de la Producción, Chaco, sede Misión Nueva Pompeya	Argentina
Diego Giménez	Secretaria del Ambiente, Dirección de Vida Silvestre	Paraguay
Anthony Giordano	Fundador y Director Ejecutivo de SPECIES	USA
Rosalia Goerzen	Cooperativa Fernheim, Filadelfia	Paraguay
Daniel Jaimes	Representante mesa de organizaciones "10 de Marzo", comunidad criolla del Impenetrable Chaqueño, técnico proyecto Quimilero	Argentina
Kristin Leus	Oficial del Programa Regional Europeo de UICN, IUCN SSC Conservation Breeding Specialist Group, IUCN SSC Wild Pig Specialist Group, Copenhagen Zoo	Bélgica
Julio Monguillot	Administración de Parques Nacionales, Director Delegación Noroeste, Salta	Argentina
Timoteo Navarrete	Cacique Comunidad Wichi, Nueva Población, Chaco, Argentina	Argentina
Nora Neris	Secretaria del Ambiente, Universidad Nacional de Asunción	Paraguay
Edder Ortiz	Guyra Paraguay	Paraguay
Pablo Perovic	Administración de Parques Nacionales, Salta	Argentina
Viviana Rojas B.	Guyra Paraguay	Paraguay
Silvia Saldivar Bellassai	Itaipú Binacional	Paraguay
Licindo Tebez	Agricultor familiar, participante del monitoreo de animales silvestres	Argentina
Jeffrey Thompson	Investigador Asociado de Guyra Paraguay	Paraguay
Ricardo Torres	Museo de Zoología, Facultad de Ciencias Exactas, Físicas y Naturales, Universidad Nacional de Córdoba	Argentina
Marianela Velilla	Gerente Programa Conservación de Especies Guyra Paraguay	Paraguay
Laura Villalba	Coordinadora del Programa de Conservación de Especies WCS Paraguay	Paraguay
Kathi Waldbrunner	Colonia Neuland	Paraguay
Andrea Weiller	Directora de la Carrera Biología, Facultad de Ciencias Exactas y Naturales, Universidad Nacional de Asunción, Paraguay	Paraguay