HISTORICAL AND CONTEMPORARY DISTRIBUTION OF FELINES IN HONDURAS

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ABSTRACT

A study was conducted to know the local declines for five felines in Honduras; puma (*Puma concolor*), jaguar (*Panthera onca*), yaguarundi (*Puma yagouarundi*), ocelot (*Leopardus pardalis*), and marguey (*Leopardus wiedii*). The study included 17 departments forming Honduras except Bay Islands, for not registering feline species. The Methodology consisted in reviewing bibliography from 1850 to 2005 (no camera trap data was included in this analysis). Collected data was ordered in an excel matrix in a binary combination (1/0), organizing historical and contemporary data, to be analyzed by **Pcord4 program**, running the cluster analysis and graphics ordination. Outcomes indicate that the historical data predicted homogenous distribution of felid all through Honduran territory. Actually contemporary distribution of felines has been disrupted and their habitat fragmented in the entire country for human activities.

Keywords: Historical, Contemporary, declines, Felines, Departments

RESUMEN

Se realizó un estudio para conocer la declinación local de los cinco felinos para Honduras; puma (*Puma concolor*), jaguar (*Panthera onca*), yaguarundi (*Puma yagouarundi*), ocelote (*leopardus pardalis*) y marguey (*Leopardus wiedii*). El estudio incluyó 17 departamentos del país exceptuando Islas de la Bahía por carecer de reportes de felinos silvestres. La metodología consistió en evaluar la bibliografía disponible desde el año 1850 hasta 2005 de trampas cámara no fueron incluidos en este análisis). Los datos colectados se ordenaron en tablas de combinación binarias (0,1) en excel, organizados en datos históricos y contemporáneos para ser analizados en el programa Pcord4 modelando análisis clúster y gráficos de ordenamiento. Los resultados muestran que históricamente la distribución se daba en la mayoría de los departamentos de Honduras y que actualmente ha sido interrumpida y segmentada a lo largo de todo el país por actividades humanas.

Palabras clave**:** Histórico, Contemporáneo, declinación, Felinos, Departamentos

INTRODUCTION

Mesoamerica provides native habitat to seven wild cat species, The puma (*Puma concolor*), jaguar (*Panthera onca*), yaguarundi (*Puma yagouarundi*), ocelot (*Leopardus pardalis*), oncilla (*Leopardus tigrinu*s), marguey (*Leopardus wiedii*) and Bobcat (*Lynx rufus*). Felines have been a very charismatic group in all over the world, but in spite of being an emblematic symbol, they have been in danger under hunting activities, cattle ranching and lost habitat. Of all threats facing the endemic mesoamerican felines, the most striking threat is habitats loss and fragmentation, primarily caused by deforestation and conversion of forest to agriculture as well as ranching, logging, and other human activities.(Sanderson *et al.* 1999). Five of the seven

mesoamerican felines occur in Honduras. Jaguar (*Panthera onca*), puma (*Puma concolor*), yaguarundi (*Pumas yagouarundi*), ocelot (*Leopardus pardalis*), and marguey (*Leopardus wiedii*) (Marineros y Martinez, 1998) local report shows losses of felines in most of the Honduras departments. Historical and systematic extirpation of felines in Honduras has not been documented.

Historical records about mammals in Honduras are scarce; the first registration was made by William Wells in 1857 in his book "*Exploraciones y Aventuras en Honduras*" where described his journey and documented the first felines: puma in Guayape, department of Olancho; jaguar for Isla del Tigre, department of Valle; marguey and ocelot around Telica Farm in Olancho. From 1879 to 1954 national and foreigner geographers compiled general data fauna, where gives an idea of distribution all throughout Honduras (Pineda, 2005).

However, registration of mammals in Honduras was collected by Cecil Underwood during 1932-1938, in the west and central region, the north of San Pedro Sula city, and the Guatemala and Nicaragua border line. His works were continued by George Goodwin, who published in 1942 "*Mammals of Honduras*" in the Bulletin of the American Museum of Natural History. Efforts to register were made by Gamero Idiaquez 1978, in his book "*Mamiferos Silvestres de Mi Tierra*" and Marineros y Martinez 1998, in their work "*Guía de Campo de los Mamiferos de Honduras*" which gathered historical and present information about mammal distribution. The data collection of Marineros and Martinez was based from field work and trips registred by biologist and students since 1980-98. During 2001-2005 biological monitoring was carried out by Forestry Administration and performed by the department of Wildlife and Protected areas, registering records for felines and other mammals (DAPVS-AFE-COHDEFOR /PROBAP 2005).

The main objective of this study is to provide evidence of local decline of five felines, trough out historical and contemporary distribution in Honduran.

STUDY AREA

Honduras contains 112 492 Km², and lies entirely within the region of Middle America referred to as Nuclear Middle America. Honduras is conforming by 18 departments divisible into three principal physiographic regions, i.e., The Caribbean (or Atlantic) lowlands, the Pacific lowlands and the interior mountainous or Serrania region (McCraine and Wilson, 2002).

METHODS

Historical data

We reviewed bibliography information since 1800 to 2005 from Pineda (2005) separating the records into the two parts: historical and contemporary periods, trying to rebuild historical felines data from 1857 to 1998 (Pineda, 2005). One of the problems was to establish trustable information data, knowing that three of the five felines have similar spot patterns and similar colors (black and brown spots with background yellow color), jaguars (*Panthera onca*), ocelot (*Leopardus pardalis*), marguey (*Leopardus wiedii*). All data considered as bias were removed from this analysis. Information data was obtained from the book "Exploraciones y Aventuras en Honduras" of Williams Wells 1857, assuming he was able to recognize unerringly at least 2

of the five felines, jaguar (*Panthera onca*) and the puma (*Puma concolor*). Also data was collected from National University, historical geographers, naturalist writers, narrative books, archeological registrations, mammal books, and experiences of hunters. One of the limitations has been gaps of information where the extinction of species has occurred through the time until the present period unknowing where exactly happened, since data has not been collected continuously and methodically.

Contemporary data

The contemporary data from felines has been registered under biological monitoring program, by Forestry Administration and carried out by the department of Wildlife and Protected areas (PROBAP, AFE-COHDEFOR. 2005), where more than 24 protected areas were collecting data by local leaders during 2001-2005, these data registered the number of species specially felines that help for the present distribution, also by personal communications with hunters, local people and others sources as books, pictures and check list from protected areas management plans. For the year 1872, Honduras had 13 political departments; however for this study, actual political division of 18 departments was considered, excluding Bay Islands, since there are no historical reports of felines (See figures 1 and 2) (Pineda, 2005).

Fig 1. Historical map of Honduras in 1872.

Fig 2. Contemporary map of Honduras.

Analysis

Collected data was arranged in excel matrix in a binary combination (presence =1 and absence =0), organizing historical and contemporary data. The matrix was converted in lotus format, to be analyzed by **Pcord4 program**, where columns represent species, and rows represent historical and contemporary departments. Running the cluster analysis using Jaccard and group average (similarity measurements) obtaining cluster dendrograms and graphics ordination to visualize grouping and segregation felines in its geographical distribution through these periods (historical and contemporary) in Honduras.

RESULTS

The analysis outcomes show that of historical data support, a large homogenous distribution of felines across the Honduran territory (See figure 3 and 5), contrasting with the contemporary distribution (See figures 4 and 6), where felines have been disaggregated on the entire country. Results show that historical and contemporary distributions of felines have two scenarios: past and present, where present distribution is divided mainly into the two geographical regions, the Caribbean and the Mosquitia.

The first region maintain approximately 1,000 square kilometers of protected areas, but with no connectivity relegating these species to isolated patches. However, the second region of Mosquitia contains more than 10,000 square kilometers, in a large and undisturbed forest. Sixty percent of the Honduran department shows local extinction of one or more species of felines.
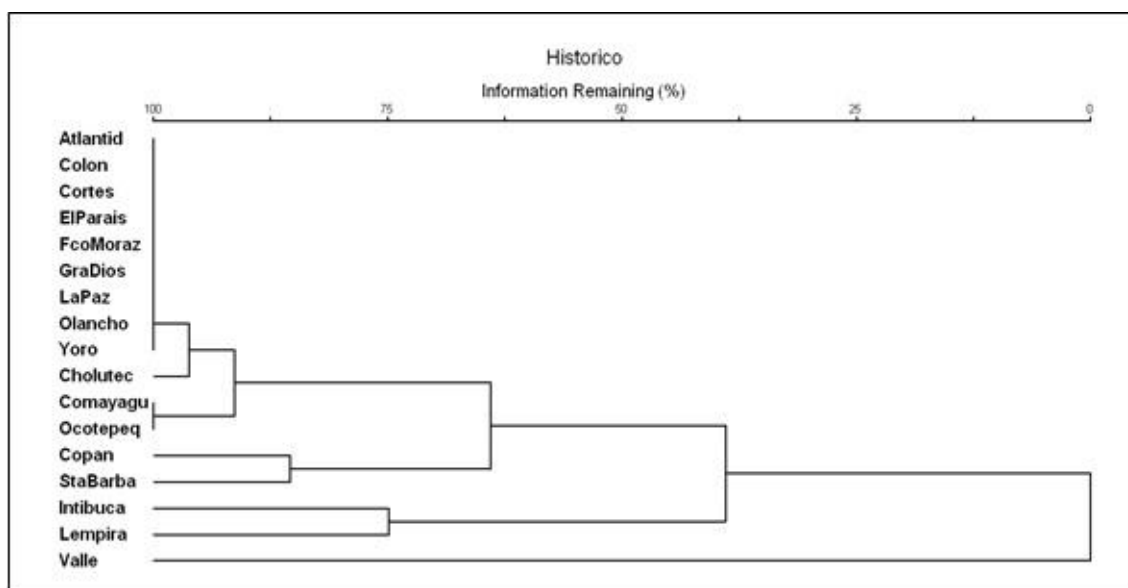
Fig 3. Historical cluster analysis indicate similarity, in nine departments, where five felines were present and the rest shows more than 75% of relationship between the departments containing the five felines, except Valle and Lempira department. These analyses indicate in the past almost homogenous distribution of felines in Honduras territory.
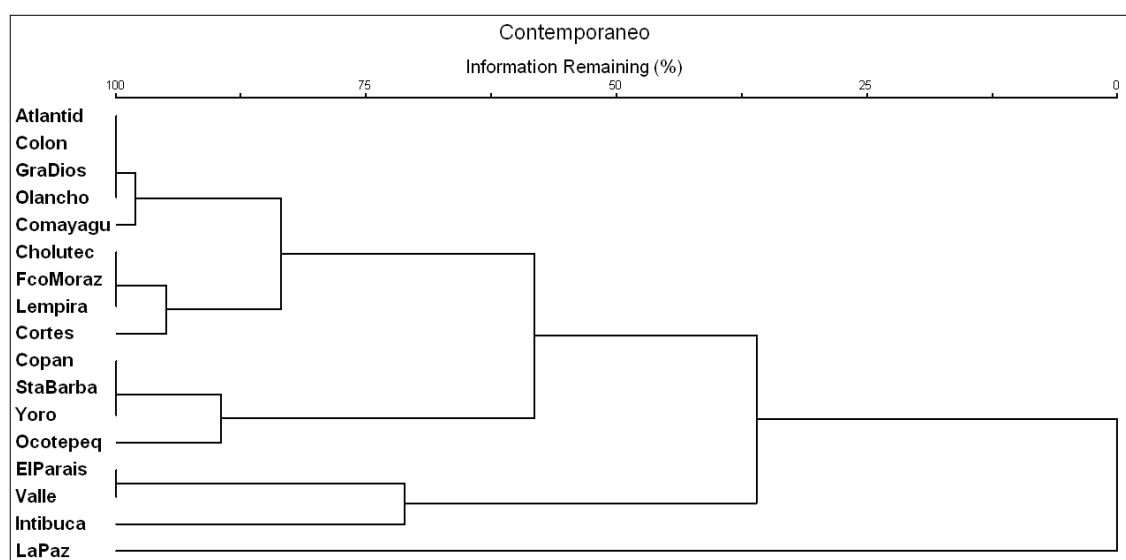

Fig 4. The contemporary Cluster analysis shows dissimilarities between 13 departments; just four departments indicate presence of five felines in the period where similarity is 100% for Atlántida, Colón, Gracias a Dios and Olancho departments.
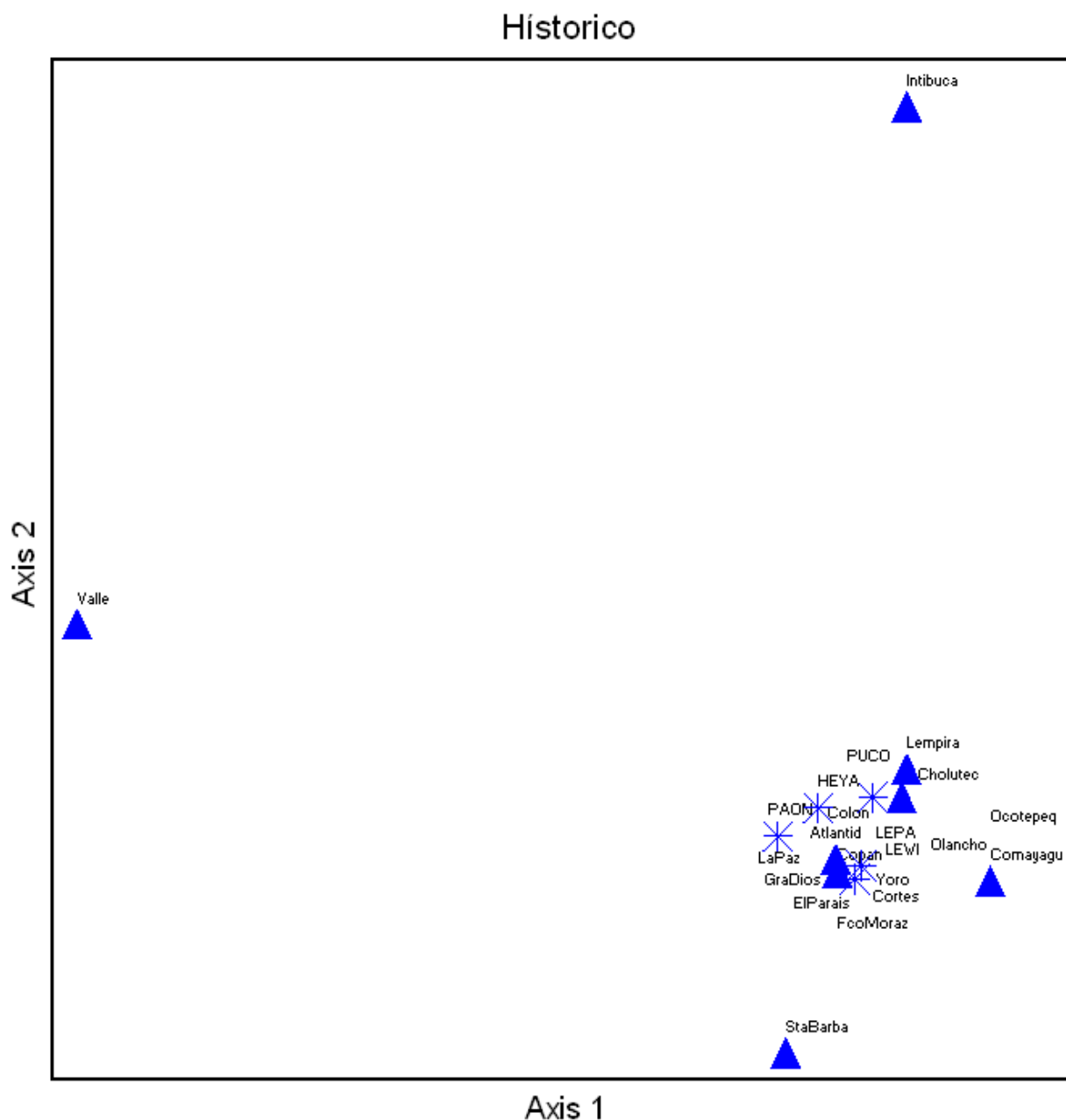
Fig 5. Supporting the historical cluster analysis, the ordination graphic suggests a similarity in all departments in the historical distribution of five felines (represented by asterisk) with departments (represented by triangle), separating Santa Barbara and Valle and Intibucá departments indicating the presence of two or three of the five felines. Description: *Puma concolor* (PUCO), *Panthera onca* (PAON), *Puma yagouarundi* (HEYA), *Leopardus pardalis* (LEPA), *Leopardus wiedii* (LEWI).
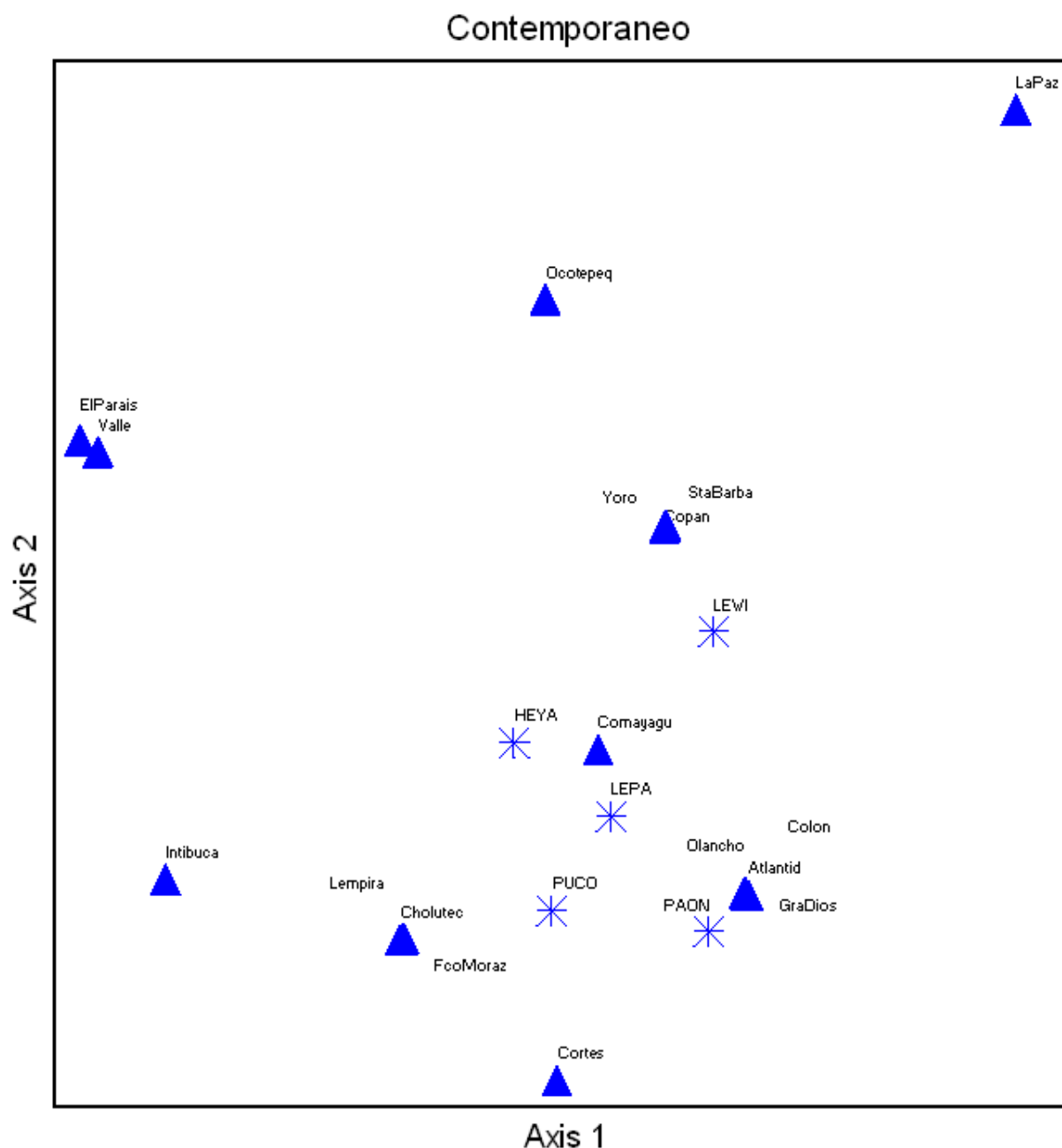
Fig 6. In the contemporary ordination graphic, shows four of the 17 departments with the presence of the five species, Atlántida, Gracias a Dios, Colón and Olancho. The rest of departments and specie shows the presence of one to three species of felines in the rest of departments. *Puma concolor* (PUCO), *Panthera onca* (PAON), *Puma yaguarundy* (HEYA), *Leopardus pardalis* (LEPA), *Leopardus wiedii* (LEWI).

DISCUSSION

The historical and contemporary Feline data in Honduras gives an idea how fast species has been extirpated. In 100 years felines have lost more than 60% of their territory distribution and its trends goes on. Extirpation processes of felines in Honduras are not clearly understood however is assumed that it has been associated to demographic growth and human pressure.

According to the contemporary data, jaguar has been extirpated in most of the departments of the south, west and middle of Honduras. The jaguar remain in four departments (Cortes, Atlántida, Olancho and Gracias a Dios) being one of the most sensitive species at human activities (deforestation, hunting, cattle ranching), which has been relegated to the Caribbean and Mosquitia region (Mora *et al* 2016; Portillo y Elvir, 2013).

The contemporary data for puma presumes more tolerance for human presence and wider action range in degradation ecosystems. Ocelots remain in primary forest where protection and food is available. Yaguarundy according to local people has been seen frequently in areas with human intervention (pastures, secondary forest, buffer areas and around villages) with the puma, are tolerant to human presence. Marguey belongs to forest pristine requiring minimum human intervention (Mora *et al*, 2016; Portillo y Elvir 2013).

The protected areas of the western and southern region, remain probably as refuge at least for three felines; ocelot, yaguarundy and puma. Even so, most of the 60 percent of protected areas don't have an effective management plan, this make vulnerable the felines habitat and turning this situation more difficult for the viability of felines in Honduras.

With presence / absence felid data, cannot quantify density for felines population, is necessary to establish a systematic monitoring for knowing their ecology, doing research using different methodology to identify felines populations (Telemetry, Trap camera, Relative abundance/transects) this is going to give to felines the possibility to establish corridors, giving them the options to move between protected areas without risking. It is necessary coordinate strategies and activities with local people and regional and national authorities in order to establish such corridors.

If the trend keeps on, total extirpation will be the future for the five felines in the country, sooner or later the most sensitive and vulnerable as jaguar and marguey and afterward the puma, ocelot and yaguarundy will disappear. We suggest a monitoring program for felines in all trough country, integrating local leaders, ONG and Government technicians responsible for wildlife management in protected areas and corridors. Education programs must focus in felines and how to live with them. Elaborate a conservation plan for each felid in order to give a second chance to remain in their original territories.

The implementation of conservation jaguar plans can be an opportunity for felines at least in the areas where jaguar is present, working as an umbrella to cover other feline species (ICF, 2011).

BIBLIOGRAPHY

DAPVS-AFE-COHDEFOR /PROBAP 2005. Informe final del monitoreo biológico. Realizado en el marco del proyecto de biodiversidad en áreas protegidas.12p.

Gamero-Idiaquez. I. 1978. Mamíferos de mi Tierra. Volumen II. Talleres Litográficos López y Cía. 427 páginas.

Goodwin G.1942. *Mammals of Honduras*. Bulletin American Museum of Natural History, Vol LXXIX pp: 107-195.

ICF. 2011. Plan Nacional para la Conservación del Jaguar (*Panthera onca*); "Promoviendo la convivencia Comunidad – Jaguar" Departamento de Vida Silvestre/ Instituto Nacional de Conservación y Desarrollo Forestal, Áreas protegidas y Vida Silvestre- Proyecto Ecosistemas- Fundación Panthera. Tegucigalpa. 29 p.

Marineros L, y Martínez Francisco, 1998. *Guía de Campo de los Mamíferos de Honduras.*

McCraine R, Wilson L, 2002. *The Amphibians of Honduras*, first edition.

Pineda, N. 2005. *Investigadores de la Geografía Hondureña*, Tegucigalpa, Honduras C.A. Primera edición.

Portillo, H y Elvir, F. (2013). Distribución de Felinos Silvestres en Áreas Protegidas de Honduras. *Revista Mexicana de Mastozoología* Nueva época. Año 3 Núm 1.

PROBAP, AFE-COHDEFOR. 2005. *El Monitoreo Biológico* del SINAPH, Documentos del Proyecto de Biodiversidad en Áreas Prioritarias.

Mora, J., J. Polisar, H. Portillo y F. Castañeda. 2016. Estado de conservación del jaguar (*Panthera onca*) en Honduras. e*n*: *el jaguar en el siglo xxi: la Perspectiva la Perspectiva continental*. (Medellín, R., J. A. de la Torre, H. Zarza, C. Chávez y G. Ceballos, eds.). Fondo de Cultura Económica, Instituto de Ecología, UNAM, México.

Sanderson, E.W., Redford, K.H., Chetkiewicz, C.B., Medellin, R.A., Rabinowitz, R.A., Robinson, J.G. & Taber, A.B. (2002). Planning to save a species: the jaguar as a model. *Conservation Biology*, 16, 1–15.

Wells, W. 1857. Exploraciones y aventuras en Honduras, 3a.edic. 1982. Editorial Universitaria Centroamericana. Tegucigalpa, M.D.C. Honduras, 544