

**CURRENT STATE OF CONSERVATION, FIRST PHOTOGRAPHIC RECORD AND POPULATION ESTIMATION OF THE COASTAL JAGUAR (*Panthera onca centralis*) AND RECORDS OF COMPANION FAUNA OF MEDIUM-SIZED AND HIGHER MAMMALS IN THE PROTECTED FOREST CERRO BLANCO OF THE CHONGÓN COLONCHE MOUNTAIN RANGE, GUAYAQUIL – ECUADOR**

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**Abstract:** The Chongón-Colonche Mountain Range is important for their goods and environmental services, its high biodiversity, and being one of the few coastal regions of Ecuador, which still houses the coastal Jaguar *Panthera onca centralis*. In the Forest Protector Cerro Blanco (BPCB), last Southeast extension of the mountain chain, it was developed the field research through the data collection with direct and indirect medium-sized and higher mammals' records. Besides a Cuddeback Digital camera trap was used, by selecting a sampling point within a probable route of the jaguar. Inspections in a nearby quarry were made to observe traces of major feline registries. The same consolidated past sightings or evidence of witnesses which complemented the study for the determination of the status of the species in the BPCB. The study showed indirect and direct records of white-tailed deer, peccaries, raccoons, agoutis, wild rabbits, howler monkeys, Capuchin white or monkeys, agouti, bears Anteaters and Jaguars from the coast for which it is considered that the BPCB is probably a meeting place between two individuals; however, it is important to note that the results presented are preliminary.

**Key Words:** Coastal jaguar, Cerro Blanco Protected Forest, medium-sized and older mammals, potential dams, life zone.

## **Introduction**

The Chongón-Colonche Mountain Range is important because of the environmental goods and services granted to local communities, its high biodiversity, and potential biological corridor for endangered species of wide distribution; among other countless features also featured is being one of the few coastal Ecuadorian regions which still houses large felines, including coastal Jaguar *Panthera onca centralis*.

In the development of initiatives with this species and after talking with members of communities is likely to confirm the presence of the jaguar commonly called tiger, due to its black spots and similar have been noticed by old movies in which their ferocity was observed to attack people, hence the general fear comes most to this species without knowing it.

This argument, along with the beauty of their skin did that until the 1970s jaguar

populations were strongly affected by direct hunting and international furrier trade (Hoogesteijn, r. and a. Hoogesteijn. 2005), this added to their natural environment damage through logging or conversion thereof in pastoral areas replacing wildlife by domestic (Borrero1967), generating a fragmentation of habitat and excessive hunting for their food sources as the deer has decimated their populations in the East and West of the country whereas in this latter region had practically disappeared (Moreno and Argudo, 1999).

The most up-to-date diagnosis of Ecuador catalogs the subspecies which is located at the West *Panthera onca centralis* as a species in critical danger of extinction (Espinosa, S. et to the. 2011); However, the researching initiatives for the species are almost nil, so there are few technical reports for the coastal zone.

In this way it emphasizes as priority research study of the presence of the Jaguar of the coast, preliminarily establish their population status and to determine presence of potential prey or companion fauna species through direct and indirect records in the southern part of the Chongón-Colonche Mountain Range within the Cerro Blanco Protected Forest which was declared as such by Ministerial Agreement No. 143 of the Agriculture and Livestock Ministry on April 20, 1989; and on October 3, 2000 by means of agreement No. 092 of the Environment Ministry its expansion to 6078 hectares was conquered.

## Study Area

Cerro Blanco Protected Forest (Figure 1) according to the floristic inventory of Neil and Nunez of the National Herbarium (cited in: Horstman, 1998; and

Horstman and Carabajo 2005), has five categories of potential natural vegetation: dry plains forest, dry forest of Rocky slopes, damp forest ravines, plateaus sub-humid forest and humid forest of Summit. Selected 5 sites of study or transects with the following characteristics (Table 1):

The transect 1 is characterized by being at a height that oscillates the 300 meters above sea level in this case is common to find it foggy part of the year with effect of occasional drizzles during dry season; as the Pigio wheelhouse reference is very close to this study site.

The transect 2 in its greater extension is part of a stream, with many other small streams along the way come together in the same; inception (Pto. 0) it is very close to the 3 Bocas dugout; It was found that it tends to hold water during the dry season of the year.

The transect 3 extends along a path that leads from the premises of the HOLCIM<sup>1</sup> quarry adjacent to the BPCB toward the Papagayo dugout, its height is 150 meters above sea level; It is a ballast path of very little use and during its journey perpendicularly converge several streams.

Transect 4 extends along the path that connects the Papagayo booth with the Jaguar stand, it starts with a very steep slope of approximately 200 meters, the continuation of the path is all flat, its height distribution is located in 300 meters above sea level at the end culminates in the Condor Creek; This gorge also presented important remnants of water source in several sectors.

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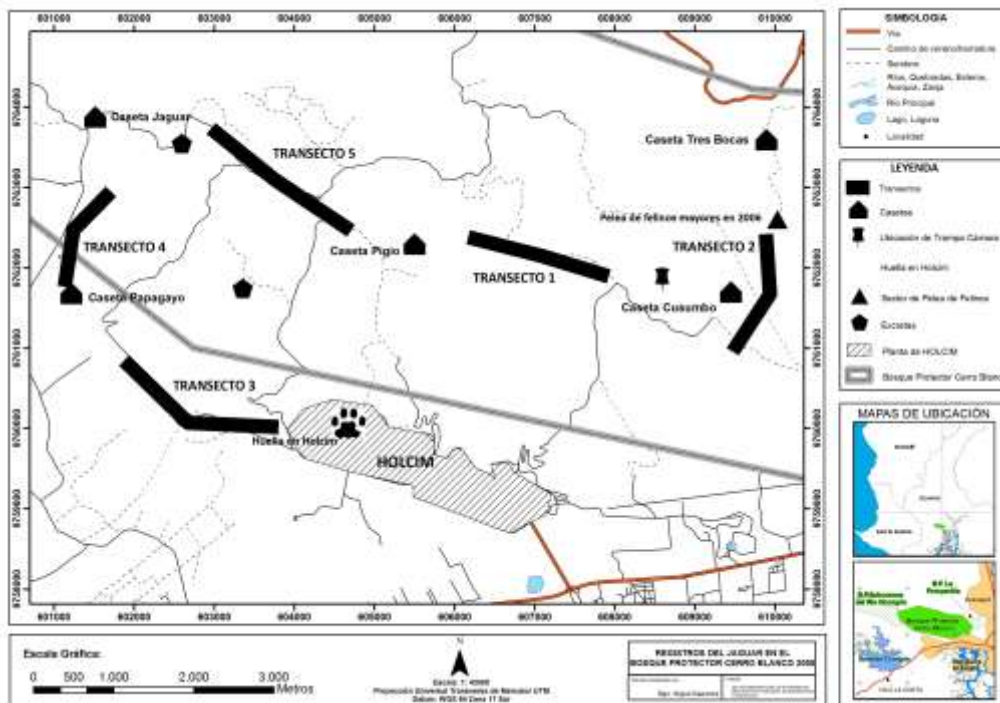
<sup>1</sup>Authorized Cantera. It is a company of the Swiss group Holcim. One of the largest cement companies in the world. taken from [www.holcim.com.ec/quienes-somos/perfil-empresarial.html](http://www.holcim.com.ec/quienes-somos/perfil-empresarial.html)

The transect 5 is a ballasting road between the Jaguar and the Pigio booths, at approximately 300 meters above sea level.

**Table 1.** Transect Coordinates

	Punto 0		Punto 1000		Punto 2000	
	X	Y	X	Y	X	Y
Transect 1 Ref.: Path to Pigio booth.	607923	9761900	607095	9762150	606168	9762388
Transect 2 Ref.: 3 Bocas stream booth.	609883	9762428	609935	9761676	609470	9760959
Transect 3 Ref.: Path Papag. to Holcim booth	603799	9760021	602667	9760074	601872	9760848
Transect 4 Ref.: Path Papag. to Jaguar booth	601708	9762954	601236	9762477	9761769	601128
Transect 5 Ref. Path Jaguar to Pigio booth	602955	9763741	603756	9763101	604705	9762465

*Taken with GARMIN GPS 60*



**Figure1.** Study area showing indirect coastal Jaguar records

## Methodology

During the period from June 22, 2008 to February 09 2009 methodology was used specifically of monitoring of indirect records (Cuesta *et al.* 2001) whereas these records: feeders, footprints, excrement, marks on trees, hairs, roosts and even direct observations, if this is done then the observation where animals have left their mark; for this method of identification was used as a guide base Aranda (2000). The surveys were in each of the transects that had a length of 2 kilometers, marked every 50 meters with orange fluorescent tape, were developed on little-used trails, areas adjacent to creeks and roads made by native fauna. In all cases selected places where ranger and ancestral users claim to have observed in the forest bigger cats records.

Travels to gather information were daytime full 3 days per transect inspection effort.

It was made by using a Cuddeback Digital trap camera, selecting a site for its location in a likely route of the jaguar in the vicinity of a booth called Cusumbo (ranger refuge booth). This device has 3.1 megapixel camera with light day and 1.3 megapixel on the night (in this period photographs are in black and white), staying active 24 hours a day.

Photographic records that were obtained from older cats allowed to determine the population estimate for the BPCB through the capture and recapture of individuals using the trap camera and the natural markings of the Jaguars with the methodology proposed by Silver, S. (2004); Similarly records of medium-sized mammals and older identified wildlife companion and/or potential prey of the bigger cats.

Additionally inspections were made at the Holcim facilities located in the coordinates 604675 9760069 attending the invitation of the Environmental Department members, who observed greater feline records through footprint in areas of the quarry and last sightings or evidence of witnesses that complement the study for the determination of the current state of the coastal Jaguar in Cerro Blanco was consolidated.

## Results and Discussion

In the transects were observed direct and indirect *Odocoileus peruvianus* white-tailed deer records, *Pecari tajacu* peccary, *Procyon cancrivorus* raccoon, *Dasyprocta punctata* guatusa, wild rabbit *Sylvilagus brasiliensis*, *Alouatta palliata* howler monkey, white cappuccino monkey or mico *Cebus albifrons* and agouti or *coatis Nasua narica*; Anteater Bear *Tamandua mexicana*. Transect 3 in the Candil creek it was registered on September 22 2008 (Photo 1) bigger feline stool and in the transect 5 it was identified another loose stool of a same specimen on November 26 2008. Placement and use of trap camera generated positive results, for the registration of an individual of jaguar and mammals companion fauna, of the same; from 22 June 2008 until February 09 2009 (Table 2).

The species that were able to be photographed were: *Odocoileus peruvianus* white-tailed deer (Photo 2), *Procyon cancrivorus* raccoon (Photo 3), *Leopardus pardalis* margay (Photo 4), *Puma yaguaroundí* jaguarundi (Photo 5), *Tamandua mexicana* anteater bear (Photo 6), *Dasyprocta punctata* agouti (Photo 7), *Eira barbara* head of matte (Photo 8), *Sylvilagus brasiliensis* wild rabbit (photo

9), *Nasua narica* agouti or coatis (Photo 10), and *Panthera onca* jaguar (photos 11, 12, 13, and 14) which through analysis of the photos is identified it is of the same individual in different periods.

**Table 2.** Registration Types for the identified species.

	R. Direct	R. Indirect	Trap Camara
<i>Odocoileus peruvianus</i>	X	X	X
<i>Pecari tajacu</i>	X	X	
<i>Procyon cancrivorus</i>	X	X	X
<i>Dasyprocta punctata</i>	X		X
<i>Sylvilagus brasiliensis</i>	X	X	X
<i>Alouatta palliata</i>	X		
<i>Cebus albifrons</i>	X		
<i>Nasua narica</i>	X		X
<i>Tamandua mexicana</i>	X		X
<i>Panthera onca centralis</i>		X	X
<i>Leopardus pardalis</i>		X	X
<i>Puma yaguaroundi</i>			X
<i>Eira barbara</i>			X

Holcim inspections show that an individual's largest feline passes through the place but remains distant to the activity of extraction of stone material and machineries; in the same way the sector is intervened (Photo 15) with the presence of a pond of artificial origin.

In the first inspection in Holcim, carried out on September 25, 2008 there were observed traces of one more feline (photos 16 and 17) without determining

the species (Puma or Jaguar), since they were slightly damaged due to soil erosion by drying; Although according to version of machinery operators confirms the observation of a Jaguar years ago (about 4 years) that match characteristics describing the species.

Second inspection on December 15, 2008 once again were tracks that probably originated due to the passage of an individual's largest feline a day after a light drizzle on December 13at night; Similarly traces were impaired by the erosion of soil by drying the material of the sector is a fast-drying (photos 18 and 19).

In relation to indirect Jaguar records for this study, agree entirely with indirect records taken by Ranger in matching or close sectors but in last years, except for one important that describes having heard a larger feline fight in 2006 between the 3 Bocas and Cusumbo booths close to the zero point of the transect 2.

About data collected in field and past records is considered tentatively a main route defined for an individual coastal Jaguar caught in trap image camera on September 16, 2008, in its journey coincides with indirect records that the rangers identified up to the facilities of Holcim, also agreeing with excreta collected on September 22, 2008 (Photo 1) in the Gorge creek and fingerprints on the premises of the quarry on September 25, 2008 (photos 16 and 17); in this way the route proposed by the rangers for this individual is, Cerro Blanco joined by ballasting road the Jaguar booth to Pigio booth, travel on a trail just walked towards the Cusumbo booth and return.

On its return it runs to Holcim facilities and subsequently returns to Jaguar booth

along the ballast road that was selected as transect 5, and through which leaves the protective forest. In this path of output commonly observed on dates subsequent to the study traces of larger feline inside and outside the jurisdiction of the BPCB.

It is worth mentioning that in the exposed route most likely it may have some entrances to the streams, in searching for places with availability of water for the dry season (Ceballos et al., 2005).

Therefore it is estimated this specimen to consider 60% of Cerro Blanco (3600 ha. approximately) as part of its territory. Gonzalez, J. (2007) estimated a density of 2.25 individuals per 10000 has. (100 Km<sup>2</sup>); This could show that Jaguar also exposed might include within its zone of life areas that are outside of the protective forest, and that this sector is probably a meeting place between 2 individuals, coincident with the report of larger feline fight on 2006.

It is important to note that the results presented are preliminary before important evidence of the presence of the coastal Jaguar in the Cerro Blanco protected forest.

## Conclusions

Keep the Jaguar, potential dams and abiotic factors that favor them, must be ensured by compliance of conservation measures for the ecosystems within the Cerro Blanco protected forest.

The low numbers of reported individuals overcome the need for compliance with the legal standards before mining extractive activities, illegal hunting and control of invasions, protection of wildlife, implementation of reforestation and the edge effect mitigation measures;

for which the technical or financial support is necessary to the administering entity of BPCB.

Important is also the continuity of research focusing on this species for the specific determination of abundance, determination of areas of life, problems of genetics; among other issues, and proposing the realization of these and other research initiatives to the rest of the Chongon Colonche mountain range.

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## ANNEXES



**Photo 1-** *Panthera onca centralis* coastal Jaguar excrete found in the Candil creek (transect 3).



**Photo 2-** *Odocoileus peruvianus* white-tailed deer moving front trap camera.



**Photo 3-** *Procyon cancrivorus* raccoon in night time activity, probably feeding.



**Photo 4-** *Leopardus pardalis* margay moving, while observing the trap camera.





**Photo 5-** *Puma yaguaroundi* Jaguarundi moving



**Photo 6-** *Tamandua mexicana* Anteater bear  
*Tamandua mexicana* in nocturnal activity



**Photo 7-** *Dasyprocta punctata* Guatusa observing another individual of its species a few meters to the left.



**Photo 8-** *Eira barbara* Matt head moving



**Photo 9-** *Sylvilagus brasiliensis* rabbit moving in evening activities, there is the brightness of her eye in the center of the image to the right.



**Photo10.-** Agouti or coatis *Nasua narica*.



**Photo 11**



**Photo 12**

**Photos 11 and 12-** Jaguar individual photos with a difference of 4 days, the second photo is of the same individual in the opposite direction. Arrows indicate similarity with photos 13 and 14 spots.



**Photo 13**



**Photo 14**

**Photos 13 and 14-** Jaguar individual photos with a difference of 1 day, the second photo is of the same individual in the opposite direction. Arrows indicate similarity with photos 11 and 12 marks.



**Photo 15-** On the left bank of the man-made lagoon traces of feline in two inspections in HOLCIM were observed



**Photo 16**



**Photo 17**

**Photos 16 and 17-** in the first there is a single track with a length of 8-9 cm. The second was measured the distance between them of 35 to 38 cm approximately (could be recognized if it was a measurement between similar ends or between front and rear)



**Foto 18**



**Foto 19**

**Photos 18 and 19-** there is a single track with a length of 8-9 cm. in the second was measured the distance between front and rear traces of 48 cm. approximately.