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Spatial Ecology, Sympatric Behavior and Conservation of Jaguars (*Panthera onca*) and Pumas (*Puma concolor*) in Belize

By Omar Figueroa

In February 2008 I initiated a project to study Jaguars and Pumas in central Belize. This project forms the centerpiece of a PhD program at the University of Florida where Frank Mazzotti serves as my major professor.

This study focuses on spatial ecology, sympatric behavior and diet of jaguars and pumas in Central Belize, and is generating critical information on home-range, activity patterns, habitat use, social dynamics and prey base.

Anthropogenic forces (e.g. roads, eco-tourism, logging, agriculture, illegal hunting) continue to fragment and reshape the region. This landscape provides good opportunity to use GPS tracking technology to advance our understanding of the ecology and behavior of these two sympatric felids. By delineating home-ranges and characterizing patterns of activities within these ranges, by describing habitat use and quantifying habitat features within core use areas, and quantitatively describing diet within this landscape, this study will provide needed information to help guide management and conservation. By quantifying the set of eco-geographical features that best



The study site. Karst hills (background) embedded within a savanna matrix (foreground). Picture by Omar Figueroa.

define the jaguar's use of space and by developing spatially explicit habitat models, this study will provide management tools with potential for an immediate conservation impact. This is especially significant given recent trends in human-jaguar conflicts and troubling patterns of jaguar persecution in the region.



Jaguar caught in a leg hold trap. Picture by Omar Figueroa.

Objectives:

- 1.To determine the population status of the jaguar in central Belize and delineate potential movement/dispersal corridors connecting the larger Maya Mountain Massif (southern Belize) with the northern Selva Maya.
- 2.To describe spatial and temporal parameters of the jaguars home range and movement and activity patterns of telemetered individuals.
- 3.To test the hypothesis that within this seasonally dynamic landscape, the jaguars prey is ephemeral but predictable in space and time, and that within the home range, jaguars will display spatial and temporal shifts in response to changes in prey availability.
- 4.Characterize and quantify use of habitat.
- 5.Quantify the set of eco-geographical variables that define suitable habitat and develop habitat suitability models to project the extent of these features in the wider landscape.
- 6.Delineate potential habitat corridors between disjunct patches of suitable habitats.
- 7.Construct jaguar's diet from scat data and test the hypothesis that jaguars select prey based on relative availability. Estimate prey abundance using line-transect sampling.
- 8.Model differential extinction rates to investigate population persistence under various assumptions about population ecology and environmental variation.

One of the primary research tools for this study is the Global Positioning System (GPS) tracking technology. I have captured 6 jaguars and 7 pumas. GPS collars were deployed on all six jaguars but due to a lack of collars only three pumas were fitted with collars. The project was dealt a severe setback when the first seven collars either fell apart or malfunctioned under the rigorous field conditions of the tropics. Two collars were deployed earlier this year (one on a puma and one on a jaguar) and both are working well beyond our expectations gathering GPS fixes according to the predetermined schedule and with many fixes interleaved within this schedule.

Through a partnership with Panthera I deployed an array of heat sensitive cameras across my study area. This camera trap survey concluded on March 15, 2009 and the results are currently being analyzed. The use of the camera trapping methodology in conjunction with the GPS data will allow me to accurately estimate jaguar and puma densities and to cross-validate certain key assumptions of camera trap methodology (e.g. density estimates). It will allow me to better understand how my collared cats are moving across the matrix of uncollared cats thereby contributing immensely to a better understanding of the spatial ecology and sympatric behavior of these two apex predators.

Natália Mundim Tôrres from Jaguar Conservation Fund named one of top 'Emerging Wildlife Conservation Leaders'

By: Jaguar Conservation Fund



Natália M. Tôrres from JCF (second row, sixth from the left) and "Emerging Wildlife Conservation Leaders" class of 2009 at White Oak Conservation Center, Florida, USA. Picture by Joe Milmo.



Natália M. Tôrres from JCF putting a radio-collar on a jaguar captured at the Caiman Ecological Refuge, Pantanal, Mato Grosso do Sul state, Brazil. Picture by Jaguar Conservation Fund.

Biologist Natália M. Tôrres, communication manager and researcher of the JCF, was selected to be one of twenty-one up-and-coming wildlife conservationists in the world to participate in a two year intensive training course called Emerging Wildlife Conservation Leaders (or "EWCL") that started this March. The course is sponsored by a wide variety of conservation minded groups, including US Fish & Wildlife Service, Howard Gilman Foundation, Wildlife Conservation Network, Defenders of Wildlife, and the International Fund for Animal Welfare.

The course flies the selected participants down to White Oak Conservation Center in Florida, where they will be trained in successful wildlife campaigning and leadership skills by some of the top conservationists in the field.

In return for their participation, participants break into groups and plan, implement and evaluate a conservation campaign benefitting an endangered species. Past projects by EWCL participants have benefitted Southeast Asian bears, okapi from the Democratic Republic of the Congo, declining amphibian populations, jaguars of northwest Mexico, and pangolins captured in the illegal wildlife trade.

"Natália was selected among a highly competitive pool for her enthusiasm and demonstrated leadership skills", said Jeff Flocken, co-founder of EWCL. "I think she will really enjoy the experience, and come out of it ready to help play a real role in conserving our planet's incredible wildlife."

Natália holds a MS in biology and is currently a Ph.D. candidate at the Federal University of Goiás, Goiânia, working on jaguar distribution modeling and the potential effects of

climate change on future distribution of the species. One of her objectives is to identify priority areas for long-term conservation of the jaguar throughout its distributional range. She is part of JCF since 2002.

[DISSEMINATION]

Jaguar dies run over by car in Iguazu National Park, Paraná – Brazil.

Read more about this case here (in Portuguese):

<http://www.oeco.com.br/reportagens/37-reportagens/21371-tragedia-anunciada-no-parna-do-iguacu>



Road-killed jaguar on the side of the road that cuts through Iguazu National Park. Picture: Acervo/Parque Nacional do Iguazu, source: www.oeco.com.

[DISSEMINATION]

Jaguar Conservation Fund supports INPA in studying jaguars in the Amazon rainforest, Brazil

In the Brazilian Amazon forest, the Instituto Nacional de Pesquisa na Amazônia (National Institute for Research in the Amazon – INPA), in collaboration with researchers from Spain and Mexico, is implementing a project studying the ecology and genetics of jaguars through non-invasive methods like camera traps, track plates and scat collection. Scat samples provide information about a species' diet, as well as its health status. Through DNA extraction, the species can be confirmed and sex and individuals can be identified. As it is generally difficult to locate jaguar scats visually, the Jaguar Conservation Fund sent Raphael Almeida, researcher and handler of Tupã, a dog specifically trained to search for jaguar scats, to assist with scat collection. The Amazon rainforest is the fourth Brazilian biome for the two to work in, having already sampled areas in the Pantanal, Cerrado and Caatinga.

Read more about the project in the Amazon and watch a TV production by Globo here (in Portuguese):
<http://portalamazonia.globo.com/noticias.php?idN=80690&idLingua=1>



Researcher Raphael Almeida and jaguar scat detector dog Tupã working in the Adolpho Ducke Forest Reserve, Amazonas, Brazil. Picture by Jaguar Conservation Fund.

[DISSEMINATION]

Expedition “Corredor do Tigre” (August 2009): Tracking jaguars and pumas in the Serra do Mar State Park, São Paulo, Brazil

By: Marcelo Mazzolli – Projeto Puma

Corredor do Tigre (Tiger Corridor, obs: in some regions of Brazil the jaguar is referred to as “tigre” - tiger) is a long term Project with the goal to identify and create conditions to protect areas with good conservation status for the jaguar in the southern portion of its distribution in the coastal Atlantic Forest.

These core areas are identified based on an analysis of jaguar presence, presence of prey species and habitat conditions.

The Project, active since 2006, is being carried out in bi-annual expeditions with foreign and local volunteers, thus guaranteeing its sustainability.

The plan is to make it permanent, considering that jaguars continue to disappear from the coastal Atlantic



Forest of southern Brazil (Mazzolli, accepted), particularly in the state of Paraná (Leite-Pitman et al., 2002; Mazzolli, 2005; Mazzolli & Hammer, 2007a; Mazzolli & Hammer, 2008).

Besides the cited publications, up to date results have been presented at a conference in Oxford (Mazzolli & Hammer, 2007b; Leite-Pitman & Mazzolli, 2007) and contributed to the 1° Workshop about Distribution, Management and Conservation of the Jaguar in Brazil, organized by Jaguar Conservation Fund and to the State Conservation Action Plan for endangered species by the Environmental Institute of Paraná (IAP).

The next step of the Project in the protected area Guaratuba, Paraná, will focus on sampling core areas, trying to identify stepping stones for re-colonization of the jaguar in its surroundings.

The expeditions depend exclusively on the contribution of the participants, who are trained to collect data in the field. Anyone can participate. Costs are R\$ 500 (approximately 225 US\$) for four days. It is possible to stay longer. Students receive a certificate and university credits, as well as a discount. For more information, access <http://uniplac.net/~puma/cursos.html>.

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[PICTURE OF THE MONTH]



Focus Tours, www.focustours.com, in partnership with the Jaguar River Lodge, (www.jaguarriverlodge.com), is operating a jaguar population research project on the Paraguay River, MT Brasil, in cooperation with CENAP/ICMBio at the Taiamã Ecological Station, and directed by Douglas Trent. The location was S 16 58'18.204", W 057 23'.52.517", Sept 6, 2006 at 4:44pm, southern edge of the reserve. We first saw the male, alone, and then the female joined him. Three times during 40 minutes of observation they tried to mate, with the female refusing at the last second. The photo was taken with a Canon 20D and a 300mm Canon lens.

By Douglas B. Trent, www.focustours.com

If you have a picture catching a glimpse of a jaguar's life in the wild and want to distribute it through our newsletter, please send it to jaguar@jaguar.org.br with a description of the location, date and credits of the picture.

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The Jaguar Conservation Fund is not responsible for the content of texts written by members of other institutions.

"Our mission is to promote the conservation of the jaguar, its natural prey and habitat throughout the species geographical range, as well as its peaceful coexistence with man through research, management and conservation strategies."

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