Ocelot Conservation in the Fragmented Atlantic Forest and in the Upper Paraná River, Brazil

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Ocelots in the Morro do Diabo State Park

The ad hoc process of reserve design and lack of management actions typically results in the reduction of the population size of keystone species for the maintenance of ecological integrity in these areas. Among these species are the top predators, which are extremely vulnerable to reduction and fragmentation of habitat. Through the regulation of prey populations, this group bears strong influence over the whole ecosystem structure, mechanism known as “trophic cascade”. The maintenance of ecologically viable populations of top predators is paramount for the achievement of nature reserves goals.

The purposes of this study are to advance in the knowledge of the ecology and to access the conservation status of the ocelot (Leopardus pardalis) in the Morro do Diabo State Park region, with 36.000 ha and located on the highly fragmented landscape of the Pontal do Paranapanema region, São Paulo State. To meet these objectives from 2002 to 2006, 16 ocelots (10 males and 6 females) were already captured and radio-collared, in order to describe space use patterns and territorial interactions. Camera Traps were have also been deployed along known ocelot trails, so abundance/density can be continuously estimated through capture-recapture models, based on the identification of photographed individuals by the unique patterns of rosettes and stripes on their pelage.

Our results so far indicate that adult males ocelots occupy mean home ranges of 19.02 Km², excluding each other territorially, but allowing the presence of females and subadult males. Mean home range for females were 8,34 Km², with overlap of up to 71% of their areas. A subadult male used a 3,99 Km² area before moving 14 Km east inside the park. Individuals located outside the boundaries of the park were preferentially along riparian zones. Density estimates of ocelots in the park were of 1 ind./3,02 Km, amounting to a population of approximately 120 individuals.

This value is close to the minimum level for short-term population viability. Recommendations are made for immediate measures regarding the reduction of mortality due to road kill, conservation of remaining forest patches and restoration of riparian vegetation corridors, as means to promote the recovery of

this population without the need to resort to more intrusive management measures.

Ocelots were captured in camera traps more frequently at night than during the day and reduce their use of roads and trails during the week previous to full moon nights and during peak full moon, a behavior previously reported for Amazonian ocelots. Population density estimates for ocelots in the Morro do Diabo State Park are two to six times lower than those at other Neotropical sites. If the Morro do Diabo population estimate is extrapolated to the Upper Paraná River, whole Green Corridor contains a population of about 1500 individuals (Figure 1). This estimate should bring our attention to the larger cats (pumas and jaguars) that live at lower population densities because the future of their local populations is compromised if protected areas are not urgently created and implemented.

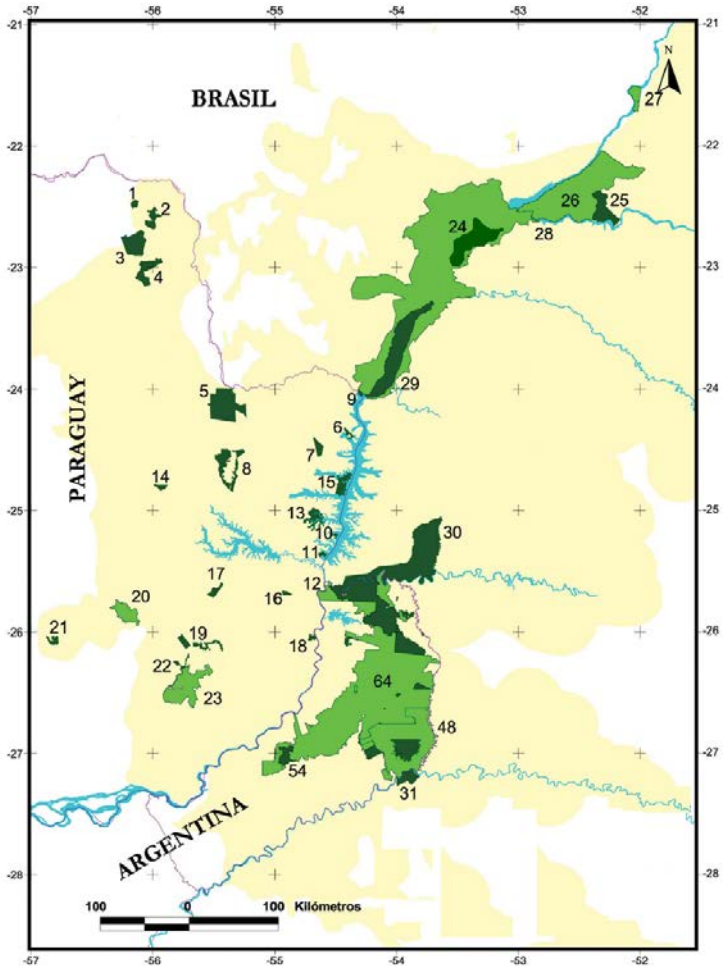

Figure 1 Some important protected areas along the upper and the lower Paraná River. Morro do Diabo State Park (25), Ivinhema State Park (24), Ilha Grande National Park (29) and Iguaçu National Park in Brazil and Argentina (30). (Source: Di Bitetti et. al. 2003).

Ocelots in Forest Fragments around the Morro do Diabo State Park

We also have been conducting ocelots camera traps estimates outside Morro do Diabo State Park in some important forest fragments remaining. At Ponte Branca Fragment a 2000 ha forest patch we only captured 2 different individuals during the survey sex ratio for sexed adult individuals was 0.67 at Urugua-í and 0.45 at Iguazú. The low sample same have not allowed us to estimate absolute population density. With the sample effort of 65 night we expected to capture more Ocelots in this fragments. Our results so far suggests that ocelots are rare in forest fragments around the park and probably due the low prey abundance available. We will continue now our efforts in camera trapping in the remaining forest fragments and start with radio telemetry to gain insights in ocelots population dynamics in this fragmented landscape.

NEXT STEPS

1) Continue field studies in ocelot density, home range and habitat selection in the upper parts of the Paraná River, including the Ivinhema Ecological Station and the Ilha Grande National Park.

With the acquisition of new and best performance camera traps, the project will survey of ocelots in the Upper Paraná River, including location grids sites in the Ivinhema State Park and the Ilha Grande National Park. This survey, will not only gain new estimates in these two most important jaguar and ocelots conservation units in the upper Paraná River, but will also allow us to corroborate our previous hypotheses in camera trapping techniques. In conjunction with GPS telemetry of the on-going collared animals, we will test if the widely-used Mean Maximum Distance Moved (MMDM) method used to calculate effectively sampled areas is significantly under-reflecting maximum distances moved by ocelots and their range-use and, thereby, considerably inflating cat density estimates.

With continued efforts, Laury Cullen and Fernando Lima and the field teams, will capture 4 ocelots and will continue updating our knowledge on ocelot home range, habitat selection and metapopulation dynamics in the Atlantic Forest. These new animals will be added to the already 11 studied animals across this range. With this information, we will update and describe the 2006-2007 metapopulation structure of ocelots in this important part of their range, knowing where ocelots remain in relation to the size and spatial pattern of forest cover, where barriers exist that separate breeding sub-populations and where habitat is degrading. Also important, with the information obtained from prey relative density from the camera trapping, we will have important insights in where humans have depleted the ocelots prey base to the point that population size declines or ocelots become locally extirpated.

New and updated simulations will be performed using RAMAS-GIS. Life history and demographic parameters used in this analysis will be inferred from this field

study as well other field and captive data on ocelots and related species. Another aim of this analysis will be to demonstrate the viability of considering another population to the upper Paraná-Paranapanema ocelot metapopulation. This will be done by including the new results that will be obtained with the expanded research to the southern range of the Paraná Corridor, including populations from the Iguaçú Falls State Park and Missiones, Argentina. Considering this scenario, it is also very important to emphasize that ocelot natural dispersal between Iguaçu and the upper Paraná-Paranapanema region is possible, when one considers dispersal distances of the species and the major forest restoration programs going along this corridor.

Project Multiple Effects

One component of the Landcape Detective long term program is dedicated to disseminating best practice and lessons learned not only to the local, state and national policy frameworks but also to other similar Ocelot Conservation Projects working in the field, with a view to adaptation and replication and extending the effect of the Project as widely as possible within Brazil. Additionally, the implementation of the conservation and management plans include stakeholder workshops at various levels to ensure that contact with the Project activities is as comprehensive as possible within the area. Locally, IPÊ's efforts in conflict resolution and articulation of mutual interests in Land Reform and Biodiversity Conservation - (see attached article recently published in Conservation Biology Special Issue in Brazil) has been an important tool to help people understand the link between their lives and livelihoods and the well-being of the environment in which they live, and its methods and approaches have been used to enhance ownership on the Project results by the stakeholders and in this way to encourage replicability.

Scientific evaluation of the role of agroforestry buffer zones, corridors and stepping-stones provides valuable evidence about the usefulness of this approach to conservation. Now, the new linkages and partnerships proposed and addressed by the project continuation at the field level with the tri-national corridor project being developed by Argentina, Brazil and Paraguay, will create a much larger habitat for the ocelots of the Upper Paraná Atlantic Rainforest Ecoregion, as well as requiring similar interventions to conserve their extent. Furthermore, in a number of other areas in the Atlantic Rainforest and indeed in other threatened biomes throughout Brazil, existing protected areas have been surrounded by public settlement Projects in recent years. The potential for protection of forest remnants and corridors in these buffer areas will rely upon agreements with land reform beneficiaries, civil society organizations and government agencies to plan their use and settlement pattern and the best practice and lessons learnt in the implementation for this project will be invaluable in both informing and speeding up this process without the need for "reinventing the wheel".

In order to reach a broader audience, IPÊ has created an education centre, The Brazilian Centre for Conservation Biology, where year-round courses are offered on environmental and sustainable development topics. It is important to recognize that few opportunities exist in Brazil for such learning. The Centre has been conceptualized to share lessons learned by IPÊ and the Wildlife Trust Alliance researchers themselves as well as by other professionals, specialists or experts in their own fields. Students from all over Brazil and from many Latin American countries participate in the courses, so experiences are widely shared. IPÊ is considered to be in the vanguard for innovative approaches to dealing with environmental and socially sustainable alternatives, having received a number of important awards for the quality of the work conducted. Such recognition has only been possible because continuous dissemination has occurred. Federal and State government environmental officials have publicly cited IPÊ's experiences as a new model that can be replicated in other Brazilian contexts. Key decision makers from Universities, Governmental Agencies and Non Governmental Organizations are always invited to join IPÊ's experiences on wildlife conservation, agroforestry and on Agrarian Reform and Environment, an important opportunity to disseminate and multiply the effects of the projects.