

PP220 Niche separation in caiman species, Peru

Three species of caimans occur in the Pacaya-Samiria National Reserve, the black caiman (*Caiman niger*), the common caiman (*Caiman crocodylus*) and the dwarf caiman (*Paleosuchus trigonatus*). The black caiman was intensively overhunted during the 1950's – 1970's and has been recovering to varying degrees over the past decades.

Studies are being conducted in the Samiria River research sites to monitor the recovery and conservation status of the caimans. This involves research on both the population status and habitat use of the caimans, and studies on their feeding ecology and niche overlap.

Current research has shown that the caimans compete for space and resources and show Lotka-Volterra competitive interactions, with the black caiman winning over the common caiman. Thus, as black caiman recover, common caiman decrease. This raises important conservation questions, since successful conservation of the black caiman will impact population levels of the common caiman.

The population and habitat studies will research the outcomes of the competitive interactions, whilst studies on the feeding ecology and niche overlap look at the mechanisms underlying these competitive interactions.

The Amazon basin is going through dramatic climate changes that will impact the largest rainforest on Earth. In 2010 the water levels of the Amazon River were at a historic low resulting in extreme dry conditions. In 2009, the same river was at a historic high, flooding huge area of Amazonian forests. More recently in 2011, the high water was again at historic highs, and then drained to historic low levels. Each year the Amazon River goes through seasonal changes between the flooding period from December to June and the low water period between July to November. However, these normal seasonal changes are now becoming more intense, which is impacting the wildlife and local people.

Research on caiman populations is being conducted to understand how the ever increasing climatic changes are impacting their ecology and populations. The wildlife of the Samiria River lives in an ecosystem that is driven by the large seasonal fluctuations occurring between high and low water seasons. The ecology of the aquatic and terrestrial wildlife revolves around these seasonal changes in water level.

The ecological conditions of long periods of flooding, up to 6 months, are very harsh on much of the floral and faunal community. Caimans have a more difficult time during the floods, since their prey is more sparsely distributed throughout the large expanses of the flooded forests. When the waters recede during the dry months, fish populations become condensed in the reduced lakes and caimans have an abundance of prey during the low water season.

The normal cycles in the Amazon forests are now being disrupted by the extreme flooding and drought events that are occurring. The flooded forests are particularly important at understanding the impacts of climate change in the Amazon, since the aquatic and terrestrial interface between high and low water seasons makes this habitat sensitive to greater seasonal variations.

The caimans are resident species and do not have migratory movements as the dolphins or fish. The spectacled caiman appears to be impacted by the extreme low water levels,

whereas the black caiman appeared to be less affected. The spectacled caiman had an overall lower abundance in the Samiria River during the drought than their six year average. The black caiman abundances are more similar and do not show general declines, with the upriver section having very similar numbers to previous years, the mid section having slightly fewer and the lower section having greater numbers than previous years.

Methods

Censuses of caimans

To assess the population and ecology of caiman species in the ecosystem it is necessary to gain an understanding of their population size. Aquatic transects will be used traveling upstream or downstream on the main river and in nearby channels or lakes. A GPS will be used to determine the distance surveyed each night. All caimans seen will be identified to the species level as best as possible and size of the caiman and location will be noted. Marco and micro habitat types will be recorded for each caiman sighting. These data, along with data collected from captured caimans, will be used to analyze the caiman population size and habitat use. Caiman surveys and captures will be conducted from a small boat fitted with a 15-horsepower engine. Caimans will be located by their eye reflections using a 12-volt spotlight and approached to a distance where the engine will be silenced and the boat paddled closer.

Noosing will be used to capture caimans. The noose will be made of a long pole about 2 m in length with a loop of rope that can be pulled tight over the caiman's neck. The caiman will be secured with rope tied around the jaw behind the nostrils and around the neck. Total body length will be measured from the tip of the snout to the tip of the tail, while head length will be measured from the tip of the snout to the posterior edge of the orbital (the vent). The sex will also be determined. Weight of the caiman will be recorded in kilograms. A measuring tape and weighing scales will be used.

The population abundance of each species will be calculated using the formula N/L , where N = the number of individuals and L = the distance travelled in kilometres. The results will indicate the number of individuals per kilometre.

Feeding Ecology

Stomach contents will be taken from live caimans using an adaptation of the "Hose-Heimlich" technique. Once secured, tapping the snout lightly opens the caiman's mouth and a PVC cylinder will be tied into place between the jaws. A tube will be then carefully inserted down the esophagus into the stomach. Water will be poured from a bottle through a funnel and down the tube, the caiman's stomach will fill with water and a second person will gently squeeze its belly up and forward towards the spine. This results in the stomach contents and water being released into a bucket. This entire process lasts about 10-15 minutes per caiman. The stomach content samples will be filtered through a mesh and the contents weighed using field scales. Solids and large particles will be emptied onto a tray for identification. The remaining particles will then be further divided into taxonomic groups/prey types. Both volume and weight of particles will be recorded.

Comparative statistical analyses will be conducted between species, size classes, sex classes, and marco and micro habitat types for both the population studies and the feeding studies. In addition, data available from previous years can be used to compare longer term changes,

both in the population status of the caiman species and changes in their resource use patterns over time.