# Giant Armadillo Project Cerrado Expansion

The giant armadillo (*Priodontes maximus*) is the largest of the armadillo species and can reach up to 150 cm and weigh up to 50 kilograms. Although giant armadillos range over much of South America little is known about them and most information is anecdotal. Due to its cryptic behavior and low population densities, this animal is very rarely seen. The giant armadillo is threatened with extinction and is currently classified as Vulnerable (A2cd) by the IUCN/SSC Red List of Threatened Species. Few people in Brazil know about this amazing species.

**The Giant Armadillo Conservation Project** has successfully established since 2010 the first long-term ecological study of giant armadillos in the Brazilian Pantanal wetland. The main goal of the project is to investigate the ecology and biology of the species and understand its function in the ecosystem using radio transmitters, camera traps, burrow surveys, resource monitoring, resource mapping and interviews. The project liaises with national and international media, publishing both scientific and mainstream publications, offers training to Brazilian Nationals, welcome visitors to our field site, and integrates the project to local and National initiatives and always liaises with local and national authorities on project results and implications.

**Project methodologies have been tested successfully**, staff trained and many excellent preliminary results obtained. This includes documenting the role of giant armadillos as Ecosystem engineers, preliminary home ranges and habitat selection results, new details on their diet and reproduction. The Project has also used its expertise to expand its research as well as educational and outreach initiatives to other species of Xenarthra including 3 other armadillo species and 2 anteater species.

**The project is currently based in the Pantanal**. The Pantanal is the world's largest continuous freshwater wetland. It is a mosaic of seasonally inundated grasslands, river corridors, lakes, gallery forests, scrub and semi-deciduous forests that supports an abundance of wildlife. Approximately 95% of the Pantanal is privately owned. Extensive cattle ranching started in the mid-18$^{th}$ Century. Under traditional management practices that consist of the seasonal movement of herds among patches of native savannas, cattle ranching is considered to have a low environmental impact and to have positively contributed to the conservation of biodiversity in the region.

**The Pantanal was the ideal place to start the project**. Giant armadillos are widely distributed in various habitat types throughout South America. Understanding the giant armadillo habitat use and habitat selection in the Pantanal gives insights about the status of this species in other biomes. The Pantanal is a mosaic of seasonally inundated grasslands, river corridors, lakes, gallery forests, scrub and semi-deciduous forests offering a wide-range mosaic of distinct habitats. The vegetation in the Pantanal is strongly influenced by four other biomes: Amazon, Cerrado, Bolivian Chaco, and Atlantic Forest. The selected study area has almost no anthropogenic threats. There is no habitat loss, no hunting, no roads and cattle ranching is practiced extensively in Baia das Pedras. This pristine area enabled us acquire base line data of the natural history of the species under no anthropogenic threats.

**It is now time to expand the project to a heavily impacted landscape** to investigate the impact of anthropogenic threats on giant armadillos in order to make conservation recommendations.

**The Cerrado is one of the world's biodiversity hotspots** and the second largest of Brazil's major biomes, after Amazonia. In the last 35 years, more than 50% of its approximately 2 million km2 has been transformed into pasture and agricultural lands planted in cash crops. Deforestation rates have been higher in the Cerrado than in the Amazon rainforest, and conservation efforts have been modest: only 2.2% of its area is under legal protection.

The Cerrado biome in the state of Mato Grosso do Sul (MS) is highly fragmented and little is believed to remain. To address this issue, in 2014 MS State authorities held a workshop entitled Zoneamento Ecologico-Economico (ZEE) with all local stakeholders and scientists to help prioritize and plan future protected areas. Thanks to our outreach efforts giant armadillos were selected as one of five mammal indicator species for the creation of protected areas. Through research, its dissemination and lobbying the Cerrado expansion of the Giant Armadillo Project aims to stimulate the creation of protected areas and proper management of native habitats in the Cerrado biome of MS to the benefit of the giant armadillo, the regional stakeholders and all the Cerrado biodiversity.

Objectives of the Giant Armadillo Project include:

1. **Research:** Continue the collection of base line data in the Pantanal.
2. **Research**: Map priority areas for giant armadillo conservation in support of ZEE.
3. **Research**: Initiate a new long term study of giant armadillos at two key sites in the Cerrado to evaluate anthropogenic threats and potential mitigating strategies.
4. **Education and Outreach**: Promote giant armadillos as ambassadors for biodiversity conservation.
5. **Education and Outreach**: Eradicate practices detrimental to giant armadillos and their habitat.
6. **Capacity building**: Provide training to the next generation of conservationists.

**This project aims to save the last populations of giant armadillos and make them a flagship species for the conservation of Cerrado biome in the Brazilian state of Mato Grosso do Sul, to the benefit of all Cerrado biodiversity**.

Due to the collaborative nature of our work, other stakeholders and project partners who own or work on land in the Cerrado will benefit from the project. The project has a strong outreach and communication component that will improve environmental education initiatives throughout the State.

**In 2015, work will continue in the Pantanal, but we will begin exploring potential new sites to expand the project to the neighboring Cerrado biome.** Before the Giant Armadillo Project started, few people knew of the existence of this rare cryptic species in our State. Thanks to the outreach and communication work of the project, giant armadillos were recently selected as one of five mammal indicator species for the creation of protected areas. The Giant Armadillo Project must therefore be able to **report in a timely manner on the distribution and priority areas for giant armadillo conservation**.

**Methodologies**. The research team will search for evidence of giant armadillos in a total of 80 native habitat fragments. Our experienced team can easily recognize giant armadillo tracks, foraging markings and burrows. Depending on the size of the fragment, visits will last between 2 and 10 days. All evidence of giant armadillos will be geo-referenced. Interviews with land owners and local communities will take place, although only direct observations of armadillo evidence by the team will be geo-referenced. Predictive distribution models will be formulated based on observation points gathered during the surveys, and on selected environmental variables that serve as predictors (e.g. land cover, elevation, distance from water, bioclimatic variables, distance from roads, human settlements, etc.). Models will be obtained using Maxent. We will also go to the field and test new areas where the species is predicted to occur. Six sites, each with different

characteristics (sizes of fragments, surrounding matrix, etc.), will be selected for intensive camera trapping. The project team will use results from the maps and density estimates to generate a recommendation for the establishment of a network of connected protected areas in the Cerrado biome of MS, and will continue to lobby for their creation. Once the distribution map is created one or two sites will be selected to initiate a long term ecological study to evaluate anthropogenic threats and potential mitigating strategies

Education and outreach efforts in the Cerrado will benefit from the many education materials created through various partnerships (materials compiled in www.vivatatu.com.br) and will target several different audiences including large national and multinational cash crop companies, landowners, rural workers, landless people, local communities, and teachers in rural and small urban schools. The project will simultaneously conduct large-scale national and state wide media campaigns as well as targeted efforts.

For the Project to expand we need to hire another biologist and **purchase a new second hand truck**. The newest truck will be used for the Pantanal work and our older truck in the Cerrado. We will keep the older truck for the Cerrado, since road access is better in the Cerrado facilitating towing the truck when it breaks down (it breaks down a lot). We will cover the new truck with an adhesive with drawings of giant armadillos promoting the project. This will protect the truck, but also help our communication and outreach efforts as this will surely attract attention.

**Total Project budget in 2015: US $ 160,000**

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