

Sample Proposal

We are happy to provide you with a sample application and share our gratitude with ICAS - Institute for the Conservation of Wild Animals / Instituto de Conservação de Animais Silvestre for providing their successful proposal from 2021 as a resource for other applicants. The Disney Conservation Fund supports projects ranging in scale and scope, and this document is intended as an example of just one of many successful proposals.

IMPORTANT TO NOTE: We have only included the information from the proposal section (Request Information Section on the application site) as a reference for you, as we thought this would be the most useful. Some questions and formatting may have changed, so the current year's proposal may not be fully represented in this example.



1) Request Information

***Project Title:** Giant Armadillo Conservation Program

Project Description: Since 2010, the Giant Armadillo Conservation Program has pioneered ecological and biological research of the rare giant armadillo and promoted conservation through education and outreach. GACP expanded activities into the highly disturbed Cerrado and Atlantic Forest biomes. Recently GACP created a certification program to promote co-existence between giant armadillos and beekeepers and published key scientific papers for conservation planning.

***Requested Cash Amount:** \$50,000.00

***Primary Country/Region Where the Project Takes Place:** Brazil

Project State(s): (Not Applicable)

***Primary City Where Project Takes Place (Or Nearest City):** Campo Grande

Geographical Coordinates: 20°26'34.01"S, 54°38'47"W

Species (Common Name): Giant Armadillo

Species (Scientific Name): Priodontes maximus

***Animal Group:** Mammals - All Other

IUCN Species Status: Vulnerable

Local Species Status:

***Principal Investigator First Name:** Arnaud

***Principal Investigator Last Name:** Desbiez

University Department:

***Principal Investigator on AZA Institution Staff?:** No

Primary Project Personnel:

*Arnaud Desbiez, PhD is Project Leader and Principal Investigator for the Giant Armadillo Conservation Project (GACP), Founder and President of the Instituto de Conservação de Animais Silvestres (ICAS- Wild Animal Conservation Institute), a Brazil-based NGO created to manage all in-country project administration. Dr. Desbiez is responsible for overall project management, field data collection, results reporting, and media and partner relations.

*Danilo Kluyber, DVM is GACP Head Veterinarian and coordinates the Giant Armadillo Veterinary Taskforce. His salary is sponsored by the Naples Zoo at Caribbean Gardens. He has extensive experience in wildlife conservation and medicine. He has worked full time for the GACP since 2011, where he is responsible for animal capture and restraint, health monitoring, veterinary data analysis and capacity building of other veterinarians.

*Andréia Nasser Figueiredo, Ph.D is responsible for implement the Education and Communication strategy of our NGO. She works with schools and stakeholders. Her salary is fully sponsored by the Reid Park Zoo.

*Gabriel Massocatto is GACP Project Biologist. Gabriel holds a BSc in Biology and is affiliated with ICAS and the Houston Zoo, which sponsors his salary. He has worked full time for the GACP since 2012 and now coordinates all field activities in the Pantanal.

*Bruna Oliveira holds a BSc in Biology and is affiliated with ICAS. She helps Arnaud to coordinate the Armadillos and Honey work. Current tasks involve community engagement

*Lucas Barreto is a MS.c student conducting research on giant armadillos in the Atlantic forest of Espirito Santos under the supervision of Aureo Banhos and Arnaud Desbiez.

*Aureo Banhos is a professor at Universidade Federal do Espírito Santo -- UFES, he is helping coordinate the Atlantic Forest expansion of the Project.

Partners: >> National: -

*Baía das Pedras Ranch: Project base in the Pantanal. Owners provide meal, lodging and a lab to the team. We work with over 10 other ranches in the region -

*Instituto de Pesquisas Ecológicas (IPÊ): Partner Brazilian NGO helps with education and communication initiatives and administrative matters when necessary

*FUBA- Brazilian Environmental Education company that provides consultancy services to ICAS

* Parque das Ave Provides training and support to team

*UFMS Local university in Mato Grosso do Sul Provides help with data analysis.

*UFES is the university of Espirito Santo and provides students and help with the Atlantic forest expansion.

*SEMED- Secretary of Education. Partners to reach both rural and urban public schools. Key partners to organize teacher training.

*Centro Nacional de Pesquisa e Conservação de Primatas Brasileiros (CPB). ICMbio. Government Body responsible for the conservation of species of Xenarthra (although they are the primate center). Responsible for hosting the National Action plan for giant armadillos published in June 2019.

>> International

*Wildlife friendly Enterprises Network. We have hired them to consult and guide us through the process of creating the certification scheme for giant armadillo friendly honey

*AZA Zoos. Our team has been receiving many capacity building opportunities, advice and support from AZA Zoos.

***Project Start Date:** 10/15/2021

Project End Date: 10/15/2023

***Previous Project Funding:** Yes

***In what years has this project been funded by the DCF?:** 2013-2014, 2014-2015, 2015-2016, 2016-2017, 2017-2019, DCF has been supporting us for 8 years. 2019- 2021.

***Project Funding Years:** No

***Please share any key accomplishments and challenges since your previous DCF grant, and describe how another grant would advance your program in a way that is different/evolved from your previous proposal?:**

Summary of Main Achievements

*Pioneered methodologies to investigate giant armadillo ecology, biology, health and genetics

*Documentation of giant armadillos as ecosystem engineers, new details on home range, habitat selection, diet, health and reproduction including key life parameters such inter-birth rates and sexual maturity. Over 15 scientific papers published.

*Project active in three Brazilian Biomes: Pantanal, Cerrado and Atlantic Forest as well as supporting research in the Chaco of Argentina.

*Maps for the Cerrado and Atlantic forest giant armadillo distribution communicated with authorities and used for habitat conservation. We are lobbying for the creation of protected areas.

*Launching a community firefighting initiative in the Pantanal that will protect 1,500 km² of land.

*Initiated new certification system to reward beekeepers that use mitigation measures to prevent giant armadillo predation of hives

*Strong education component partnered with state authorities to train science teachers multiplying our reach.

*Education and communication strategic plan published in 2018, two full time educators

*Outreach and awareness extensive use of print, radio, social media;

*Citizen Science initiative involving local stakeholders

*Successful capacity building program over 85 nationals trained since 2010

*60 minute documentary on giant armadillos will be shown on PBS in April 2017

*Participated and implementing the government National Action Plan for giant anteaters and giant armadillos.

This new proposal is based on results from the Giant Armadillo distribution map and aims to create a new concept of Giant Armadillo Conservation units to highlight, protect and enhance the last areas with potentially viable populations of giant armadillo in the Cerrado of Mato Grosso do Sul. This proposal also continues our efforts to promote co-existence between beekeepers and giant armadillos and our education and outreach efforts.

***Report Submission:** Confirmation.DCF.Midterm Report.GACP.2019-2021.November 21, 2020.pdf
Conservation Program Summary: The giant armadillo (*Priodontes maximus*) is the largest armadillo species in the world, with a wide distribution throughout various South American habitats. However, due to their cryptic behavior, low densities, and slow population growth rates, giant armadillos are scarce, rarely seen and until recently little was known about them. Giant armadillos are very sensitive to anthropogenic impacts and can rapidly become locally extinct. The species is listed in Appendix I of CITES, and classified as Vulnerable by the IUCN. In Brazil, the species is classified as Critically Endangered in many states, and is in danger of local extinction.

In 2010, the Giant Armadillo Conservation Program (GACP) successfully established the first long term ecological study of giant armadillos in the Brazilian Pantanal and continues to uncover key information necessary for conservation planning. The project expanded activities into the highly disturbed Cerrado biome in 2015 as well as into the Atlantic Forests of Mato Grosso in 2016, Espírito Santo in 2017 and Minas Gerais in 2020. The program's ultimate goal is to make giant armadillos ambassadors for biodiversity conservation in Brazil.

Both the Cerrado and Atlantic Forest are highly threatened habitat for the giant armadillo. The Cerrado is classified as a biodiversity hotspot, with deforestation rates higher than the Amazon. The Atlantic Forest biome is even more threatened and only 8% of its original cover remains in widely distributed fragments. In the Atlantic forest we have discovered that only one potentially viable population of giant armadillos remain, and in the Cerrado individuals remain in highly fragmented isolated small non protected fragments. We are linking results from research in the Pantanal with conservation actions in the Cerrado and Atlantic Forest to protecting giant armadillo populations.

The project has pioneered methodologies to investigate giant armadillo ecology and biology, promoted conservation awareness through environmental education and outreach, and has become one of the leading capacity-building projects for aspiring conservationists (over 85 Brazilian biologists and veterinarians trained). Results from our long-term study in the Pantanal have advanced scientific knowledge and yielded important conservation information, such as identifying giant armadillos as ecosystem engineers or demonstrated that the species reaches sexual maturity between 7-8 years of age instead of 12 months and they only have one pup every three years due to extensive parental care.

The GACP played a key role in creating the recent 2018 National Action Plan for Giant Armadillos, and is uniquely positioned to implement the plan in the Pantanal, Cerrado and Atlantic Forest. Our team has mapped the distribution of the species in the Cerrado of Mato Grosso do Sul, recently influenced land use policies. The municipality of Campo Grande now uses the giant armadillo distribution map as guide for where economic activities or habitat conservation should take place! We have also recently created a certification program to promote co-existence between giant armadillos and beekeepers to eradicate the killing of giant armadillos that raid hives, published key papers for conservation planning, and started a new long-term project to protect the last population of giant armadillos in the Atlantic forest.

Over the next two years, we will continue our long-term study of the species in the Pantanal and expand field research in the Atlantic forest of Minas Gerais, where the last populations persist. In the Cerrado, through this proposal we would like to start working with local stakeholders to create a new concept of Giant Armadillo Conservation Units, while continuing to lobby for protected areas. We will also continue to engage beekeepers to participate in the wildlife friendly certification program and implement mitigation measures to prevent giant armadillo raids. Most importantly, we will continue to implement our education and communication strategy and continue to offer capacity building opportunities.

Support from the Disney Conservation Fund will be used to: (1) continue long term data collection in the Pantanal; adding camera traps for a DCF funded long term grid; (2) cover travel costs to visit and attend stakeholder meetings and workshops to create new Giant Armadillo Conservation Units (3) expand and widely communicate the new giant armadillo friendly certification for beekeepers; (4) enhance outreach and education efforts in all the three biomes.(5) purchase of camera traps for the new grids. Specifically, funding will be used to purchase monitoring equipment and materials, some travel and per diem costs for extension work in the Cerrado to create Giant Armadillo Conservation Units and expand the certification program and augment matching fund support for educational and outreach materials.

Field Research Objectives: The overall goal of the GACP is to promote giant armadillos as a flagship species for biodiversity conservation and to safeguard remaining native habitats and populations in Brazil. In addition to maintaining the long term activities in each biome: Pantanal, Cerrado and Atlantic Forest. Applied conservation priorities for the next two years that the DCF (October 2021-2023) will focus on include: (1) To create the concept and identify at least 2 Giant Armadillo Conservation Units (GACU) in the Cerrado of Mato Grosso do Sul. This will lay the ground work to create more GACU in Mato Grosso do Sul, the rest of the Cerrado and their distribution range in the future (2) work with stakeholders and government authorities to create a community conservation action plan for each GACU that will mitigate threats and ensure that a viable population of giant armadillos will persist ; (3) Implement the giant armadillo friendly honey certification, so that by October 2023 almost all beekeepers (200-250 working in areas where giant armadillos are present) adhere; All beekeepers working in the GACU will participate (4) Implement long term camera trap grids in three Brazilian biomes (Pantanal, Cerrado, Atlantic forest) for comparative ecological studies to inform conservation planning and science-based decision making.

Field Research Strategies and Evaluation: As stated above, In addition to continuing our long term research in the Pantanal, strengthening the project in the Rio Doce state park in the Atlantic forest and lobbying for the giant armadillo distribution map to influence habitat conservation measures in the Cerrado the applied conservation priorities the DCF will focus on for the next two years (October 2021-2023) include: (1) Creation of Giant Armadillo Conservation Units (GACUs) (2) Community conservation Action plans for each GACU (3) Get almost all beekeepers in the Giant Armadillo Distribution area of MS to be certified Giant Armadillo Friendly (4) Implementation of long term camera grids in three Brazilian Biomes .

1)Giant Armadillo Conservation Units

The work will be initially based on the Giant armadillo distribution map (Ferraz et.al., in press) which uses the Maxent algorithm and 30 possible explanatory variables (including Bioclimatic variables, Land Cover from MapBiomas and others) based on 164 confirmed presence points from 344 surveyed watersheds. This paper and work show that the probability of giant armadillo presence was associated with native forests and savannas, however this suitable habitat is heavily fragmented. There are only 69 patches of suitable habitat 25 km² in the Cerrado of Mato Grosso do Sul. Our studies in the Pantanal show that the average home range of an adult giant armadillo is 25 km² (Desbiez et. al, 2020a). Therefore, to maintain a viable population we will need to ensure connectivity between many fragments and to mitigate all threats especially from beekeepers that work in these fragments to produce honey. We will adapt the techniques employed to create Jaguar Conservation Units (JCU) (Morato,R.G., Ferraz et. al., 2014) to create the new concept of Giant Armadillo Conservation Units (GACUs).

This is a new concept that will guide our work for years to come and will be the main product of this grant: creating the concept, selecting two GACUs and creating and community action plan to implement conservation measures so that a viable population of giant armadillo will persist in the long term.

We are currently analyzing potential methods to be used and the best softwares (softwares such as least cost path) that will allow us to first create the methodology and tools to designate GACUs on paper. I will collaborate with several specialists to find the most appropriate methods. Once the GACU are designed on paper, our team will run a series of field visits to select two of the most promising potential GACU to test and illustrate this concept. Field visits will confirm signs of giant armadillos, assess all the potential threats, map the stakeholders and economic activities, preliminary talks with key stakeholders to gauge our chances for partnerships. It is key that the two GACUs selected are promising for implementation of mitigation measures. These two GACUs will be showcasing this concept in the future. In the next 10 years we will want to expand the GACU concept to safeguard the future of giant armadillos throughout their distribution.

Success for this objective will be a concept paper of the tools and guidelines for the creation of GACUs. A scientific paper will be later prepared to illustrate the concept once the two GACUs have been successfully established.

2) Action plans for each GACU

Field visits mapping threats and opportunities will take place in each GACU. Due to the 10 years of experience of the Giant Armadillo Conservation Program we have good field experience to help us conduct this analysis. Semi-structured interviews with local stakeholders and communities will take place to assess threats, opportunities and asses' perceptions of the giant armadillo before the project is implemented. After meetings with the stakeholders a community conservation action plan for each GACU will be designed and implemented.

Success for this objective will be a participatory community endorsed individual action plan for each GACU.

3) Most beekeepers in the Giant Armadillo distribution Area produce giant armadillo friendly honey.

We have a detailed map of where giant armadillos occur in Mato Grosso do Sul (Ferraz et. al., in press; Fig 1). We have studied the conflict since 2016 (Desbiez et.al., 2000b). We have created the guidelines for mitigation measures, the norms and contract to gain the certification have been created by hiring the consultancy support from the Wildlife Friendly Enterprise Network. Through workshops and meetings, we have obtained government approval and endorsement of our certification program. We are almost ready. We are now running a pilot study to test the implementation of the certification program on 20 beekeepers to understand what changes need to be made to improve the languages, concerns and practices of beekeepers. Through this process we are adding fire management protocols, changes to the contract to facilitate its understanding and probably other small changes will need to be made. This phase is very important to ensure a smooth roll out of the program in the future. By the time the DCF project initiates (October 2021) we will have everything in place to increase the certification process to all beekeeper in the giant armadillo distribution map. By the end of this grant we aim to have most beekeepers certified and ALL beekeepers working in the 2 designated GACUs certified.

Success for this objective will be the number of signed contracts from beekeepers (should be close to 200) adhering to the certification program.

4)To assess Population viability of giant armadillos we will use the Vortex software and all the life history parameters studied in our 10 year research program in the Pantanal. However on key piece of information that is lacking for these estimates is the the density of giant armadillos. We have recently published Desbiez et. al., (in press) a study demonstrating that through careful camera trapping we can estimate densities of giant armadillos with the same accuracy as an 8 year field study using telemetry. We will therefore apply these and creat a camera trap grid in less fragmented and highly fragmented areas of the cerrado of MS in the giant armadillo distribution area to estimate denisties in areas of high and low suitability. Camera trap grids will be placed inside one or both of the selected GACUs. This data will be key to enabling us to create GACUs and calculate minimum viable populations of giant armadillos.

We will maintian these camera trap grids for the long term to study population trends, behaviour, health, and reproduction (Massocato and Desbiez, 2019). We will use this data for a long term comparative study of our camera trap grids in the Pantanal, Cerrado and Atlantic forest. By the end of October 2023 the giant armadillo conservation program will hae three long term camera trap grids studies in three Brazilian biomes. This will be key to the long term objectives of the giant armadillo conservation program.

Success for the field research will two sites designated as Giant Armadillo Conservation Units in the Cerrado with initial camera trap grids.

Animal Welfare: In the Pantanal we will continue captures of giant armadillos. The Giant Armadillo Veterinary Task Force was established in 2010 with the objective of designing, implementing, and evaluating all procedures involved in the capture and handling of Xenarthrans. Every precaution is taken to minimize impact and stress on captured animals. The task force includes a team of experienced and respected Brazilian wildlife veterinarians. Only task force veterinarians are allowed to conduct animal captures and handling, and a minimum of three people are always present during a procedure. Details of the procedure that has been used over 100 times in armadillos has been published by Kluyster et.al., (2020). Once an animal is captured, the handler initiates restraint measures, and the veterinarian intramuscularly administers anesthetic agents into the quadriceps or the semimembranous muscle group of the hind limb. All captured animals are kept under general anesthesia using an established protocol extrapolated by allometry and based on the combination of Butorphanol 10mg/ml (0.1 mg/kg) + Detomidine 10mg/ml (0.1 mg/kg) + Midazolam 5 mg/ml (0.2 mg/kg). The main characteristic of this protocol is a rapid induction, unconsciousness and total absence of pain during the procedure. The anesthetic can be reversed using specific reversal agents for each drug: Naloxone (0.04mg/kg) to reverse the Butorphanol, Yohimbine (0,125 mg/kg) to reverse the Detomidine, and Flumazenil (0.025mg/kg) to reverse the Midazolam. The reversal protocol is administered intravenously and promotes a smooth and quick recovery (2-8 minutes), allowing the animal to resume normal activity immediately after the procedure. In addition, reversal agents can be used in the event of emergencies such as respiratory arrest or depression of cardiac rates. The anesthesia and reversal protocols have been successfully implemented in all of our giant armadillo and anteaters captures and inductions since 2011. During anesthesia and recovery, vital signs (e.g., cardiac and respiratory rates, temperature, and blood oxygen concentration) are continuously monitored. The animal is only released after a careful clinical evaluation and total absence of drug effects. While animals are immobilized, the team takes morphometric measurements and collects biological materials for epidemiological and genetic studies. The team also conducts a detailed health evaluation of each animal to assess injuries, ectoparasite load, and evidence of reproductive activity. Animals are always released in the same burrow where they were captured. All animals are safely crated until full recovery from the anesthesia.

These procedures are safe and we have never experienced any issues in the 10 years of the program.

***Education and Outreach Objectives:** Giant armadillos and their habitat can only be effectively protected if people know that they exist and care about their survival. Therefore, one of the primary goals of GACP's education and outreach program is to get the species on the national and international 'conservation radar,' and promote a greater understanding of the importance of giant armadillos to healthy ecosystem function. The ultimate goal of GACP's education and outreach efforts is to promote giant armadillos as a flagship species for biodiversity conservation, and inform land management practices that are less harmful to the species. In April 2018, GACP produced an education and communication strategy for the entire program. While each biome (Pantanal, Cerrado, and Atlantic Forest) requires tailored action, there is an overarching strategy to engage and inform the public about the importance of giant armadillos and biodiversity conservation; involve stakeholders in the creation and support of protected areas; and inform land management activities that are less harmful to giant armadillos and their habitat. While continuing to implement strategies from our action plan, specific objectives for the next two years include, (1) creating a specific education and communication plan for each GACU which will include very specific and local activities to promote the GACU, (2) the implementation of our public school campaign in all schools surrounding or near the GACU.

Education and Outreach Strategies and Evaluation:

This year due to the Pandemic our education activities have been very much modified and we needed to get creative. In April 2018, the Giant Armadillo Conservation Program produced an education and communication strategy to guide the team's education and outreach activities. The strategy includes an overarching component to engage the public, as well as specific actions targeted to each of the biomes in which the GACP is operating. However, workshops, activities with teachers and all training sessions have been canceled or modified since March 2020. Radio, television, and internet media continues to be used to educate the public about giant armadillos and promote the species as a flagship species for biodiversity conservation. We have brought all our education resources on a virtual platform <https://www.icasconservation.org.br/educacao>.

In the next two years, the GACP will continue to actively collaborate with public school teachers respecting the challenges they have and may still face due to the Pandemic. Our education team has prepared comprehensive teacher training programs and materials for science teachers of children age 8 to 12. All materials have been tested, and are available on line. However as many of the activities include hands on activities. Teachers have found it sometimes challenging to use online. Furthermore teachers are facing so many other challenges that we have preferred to hold off some of our efforts until the Pandemic is over. I believe and really hope that by the time this proposal starts in October 2021 the issues with the Pandemic will be over.

We will continue to improve our program to engage public schools throughout the state while targeting municipalities in giant armadillo presence zones. In particular we will focus on all the schools found near or around the Giant Armadillo Conservation Units. In this case we will contact and work with both private and public schools. Specific measurable actions include: developing more partnerships within the educational network; implementing our engagement plan for schools and the teacher training program; developing new educational resources as required (including input from educators); and, developing videos to show educators how to use these materials. The team will evaluate the impact of these interventions on the students and teachers using pre and post questionnaires. One of the focuses of GACP's new Education and Communication Strategy is connecting young people, and by extension their families, with Brazil's biodiversity through giant armadillos as conservation ambassadors.

In addition to our work with schools we will continue to engage rural communities and the wider public by broadening awareness of the species and its habitat needs. The team aims to deliver communications with rural communities and the wider public in a way that supports the outcome that 'landowners feel valued for their role in conservation.' The number of educational activities delivered and the number of people engaged will be tracked, and the team will survey public perceptions and awareness of giant armadillos at public events. In the next few years metrics will particularly focus on stakeholders within, near or around the Giant Armadillo Conservation Units.

Education and outreach activities are also an important component of GACP's approach to the beekeeper conflict, which is addressed in the field research section. In particular, the project aims to educate beekeepers about giant armadillo friendly ways to protect their hives from predation. The impact of project activities, including potential attitude/behavior change on beekeepers will be monitored and assessed through the use of pre and post questionnaires conducted with beekeepers within the project area (pre-intervention questionnaires have already been conducted and will be published at the end of 2021). Education activities and information aiming to include both beekeepers, their families, but also the surrounding community to be engaged in the protection and value of giant armadillos and their habitat will be constantly delivered through this two year period (October 2021 -- October 2023).

***Applied Conservation Objectives:** The overall goal of the GACP is to promote giant armadillos as a flagship species for biodiversity conservation and to safeguard remaining native habitats and populations in Brazil. Applied conservation priorities for the next two years (October 2019-2021) include: (1) tackling the issue of habitat loss and fragmentation, which is the biggest threat to giant armadillos throughout their distribution by creating a new concept of Giant Armadillo Conservation Units which aim to secure a long-term viable population of giant armadillos by engaging all stakeholders. We will apply community conservation concepts tailored to each situation. We aim to export this concept throughout the species range in the future. (2) Incentive program to prevent the human-wildlife conflict which is causing the unnecessary death of giant armadillos that predate beehives. We will provide incentives to promote co-existence. Once again once we have perfected this work, we plan on expanding this work throughout the species range in the future.

Applied Conservation Strategies and Evaluation:

The GACP utilizes a number of complementary methodologies to secure its conservation goals, objectives, and outcomes which will be key to the success of this proposal. These include: community involvement, conservation strategies guided by scientific data and strong education and outreach work

First and foremost, GACP team members keep local stakeholders updated on research progress, and involve them in fieldwork as much as possible. This has been the project's approach since its inception in the Pantanal. This approach has been applied to the expansion of activities into the Cerrado and Atlantic Forest. Involving local stakeholders and changing negative perceptions and practices are critical to the long-term success of the project's research and conservation efforts. In the Pantanal, where the GACP has been working since 2010, there is now a tangible local interest in the species--one that did not exist before the project. We are currently capitalizing on this to create a community led coalition of ranches to fight the fires in the Pantanal. A firefighting experiment that can only happen due to our strong standing within the community. Stakeholder groups have always been invited to participate in field activities, and the project has enjoyed particular success securing the participation of local school children, which enjoy helping change camera traps, searching for burrows, and collecting daytime telemetry data. Interesting data, camera trap images, and research findings also are regularly presented to local stakeholders via printed materials, social media, and presentations at meetings and special events that are designed to build local support for the GACP and giant armadillo conservation. Stakeholders addressed include rural workers, children and teachers in rural schools, women's groups, landowners, and staff from local ecotourism facilities. This approach will guide the creation and mitigation of threats in the Giant Armadillo Conservation Units of the Cerrado of MS and will involve national and multinational cash crop companies, landowners, rural workers, landless people, local communities, and teachers in both rural and small urban schools. This community-based approach has always guided our work. It has also been successfully implemented to create the giant armadillo friendly certification program.

Second, the GACP bases all its conservation strategies on scientific results and utilizes data analysis, project reports, and scientific papers to influence local and national public policy. Progress reports containing project information and results are regularly sent to the regional and central offices of the Brazilian Federal Agency for the Conservation of Nature and Natural Resources (IBAMA), as well as to the State and Federal Ministries for the Environment and Natural Resources (IMASUL). A staff member also regularly participates in their meetings. Through these reporting efforts, the project aims to influence conservation planning. Additionally, the GACP managed to influence policy so that giant armadillos were selected as one of five mammal indicator species for the creation of protected areas in the state of MS. Thanks to our close long-term relationship with both government and non-governmental partners, today the GACP is in unique position to contribute directly to the planning of protected areas in MS, to the benefit of giant armadillos and other threatened species. WWF Brazil has endorsed the GACP's efforts and will help lobby for the creation of protected areas based on project results, and IMASUL, one of Brazil's land management authorities, has also agreed to use GACP data to analyze any future deforestation licenses. The GACP was instrumental in the creation of a National Species Action plan. In fact, GACP is responsible for 24 of the 31 actions proposed in the National Action Plan for Giant Anteaters and Giant Armadillos. Having a National Action Plan for this species is one of GACP's long-term objectives, which is now being realized. This science based approach and strong relationship with authorities and other partners will be key in helping to create, validate and expand the concept of Giant Armadillo Conservation Units.

Third, GACP's Education and Communication Strategy emphasizes the use of a diversity of tools and mediums to both educate and engage the public about giant armadillos and promote the species as a flagship species for biodiversity conservation. Giant armadillos and their habitat can only be effectively protected if people know that they exist, care about their survival and feel that they represent their biodiversity heritage. Therefore, one of the primary objectives of GACP's conservation outreach programming is to get the species on the national and international 'conservation radar,' and promote a greater understanding of the importance of giant armadillos to healthy ecosystem function. Our education and outreach work are part of everything we do. We use the science, and different tools to reach our audiences. Our education and outreach strategy will be tailored to the specifics of community and stakeholders around each Giant Armadillo Conservation Unit to ensure success.

It is the combination of community involvement, strategies guided by scientific data and strong education and outreach work that have guided the Giant Armadillo Conservation Program throughout the years and will continue to be the guiding principles for this proposal. In this proposal we aim to create some new exciting tools for giant armadillo conservation throughout their range to protect them from habitat loss and fragmentation as well as human wildlife conflict. The concept of creating Giant Armadillo Units as has been developed by scientists for the Jaguar could be a game changer for the wider conservation of the species. We will be collaborating with these researchers to create our concept for giant armadillos. By the end of the two-year period a clear concept paper to be turned into a scientific paper will be made available as well as the community conservation giant armadillo action plans for each GACU. The use of community incentive programs such as our certification program are fantastic tools to help promote the co-existence between giant armadillos and beekeepers. In Desbiez et.al. (2000b), we further show that there is evidence of this conflict between giant armadillos and people in Columbia, Argentina and other regions of Brazil. Once we have finished certifying all beekeepers in MS we will seek to expand the program. Both of the tools created by this project GACU and Certification will be further expanded to other areas of the species range in the years beyond this proposal.

Project Outputs: Number of hectares protected over baseline:
Number of animals in project focal area over baseline (population increase over one year, if applicable):
Number of animals reintroduced into the wild:
Number of people engaged through community conservation outreach programming: 1000
Number of people who have taken action to protect threatened species or habitats based on their experience (through your programming):
Number of people reached by conservation messaging: 100,000
Number of beekeepers who have taken action to protect threatened species or habitats based on their experience (through certification programming): 200
Number of Giant Armadillo Conservation Units identified : 2
Number of schools implementing giant armadillo campaign: 200
• Number of community conservation plans for GACU : 2

Social Media Pages: Facebook: Projeto Tatu-Canastra/Giant Armadillo Project – Brazil @projetotatucanastra <https://www.facebook.com/projetotatucanastra?fref=ts> Instagram: @projetotatucanastra Youtube: Instituto de Conservação de Animais Silvestres ICAS https://www.youtube.com/channel/UCQS196_9YH-sMxuDPHGgIXg

Photo Upload: Figure 1. Giant Armadillo Distribution Map in Mato Grosso do Sul and camera trapping study.png, 4. Danilo Kluyber Project veterinarian.jpg, 2. DCF has purchased many camera traps for the project.JPG, 3. Giant Armadillo Release.jpg, 1. 10 year passion for giant armadillos.jpg

Timetable: DCF_timeline for Giant Armadillo Conservation Program.pdf

Budget : DCF_Annual_Grants_Budget_Giant Armadillo Conservation Program.pdf

Literature Cited: Desbiez, A.L.J., Massocato, G.F., Kluyber, D., Oliveira-Santos LGR and Attias, N. 2020a. Spatial ecology of the giant armadillo (*Prionomys maximus*) in Midwestern Brazil. *Journal of Mammalogy*. 101 (1) 151-163.

Desbiez, A.L.J.; Oliveria, B., and Catapani, M.L. 2020b. Bee Careful! Conflict between beekeepers and giant armadillos (*Prionomys maximus*) and potential ways to coexist. *Edentata*. 21: 1-12

Desbiez, A.L.J., Massocato, G.F., Attias, N. and Cove M.V. 2021. Comparing density estimates from a short term camera trap survey with a long term telemetry study of giant armadillos (*Prionomys maximus*). *Mastozoologia Neotropical*. In press.

Ferraz, K.M.,P.M.B. Oliveira, B., Attias N., Desbiez, A.L.J. 2021. Species distribution model reveals only highly fragmented suitable patches remaining for giant armadillo in the Brazilian Cerrado. *Perspectives in Ecology and Conservation*. In press.

Kluyber D., Lopez, R.P.G., Massocato, G., Attias, N., Desbiez A.L.J. 2000. Anesthesia and surgery protocols for intra-abdominal transmitter placement in four species of wild armadillo. *Journal of zoo and wildlife medicine*. 51 (30):514 -526

Massocato, G.F. & Desbiez, A.L.J. 2019. Guidelines to identify individual giant armadillos, *Prionomys maximus* (Kerr, 1792), through camera traps. *Edentata* 20:1-16

Morato, R.G. K.M.,P.M.B. Ferraz., R.C. de Paula, C.B. Campos. 2014. Identification of priority Conservation Areas and potential corridors for jaguars in the Caatinga biome, Brazil. *Plos One*. <https://doi.org/10.1371/journal.pone.0092950>

Background Upload: Desbiez curriculum vitae.pdf

Diversity and Inclusion: Our projects aim to work with, gain knowledge of, and collaborate with those who live with the giant armadillo. This includes very diverse stakeholders and communities. In the same day I may speak to a powerful landowner, then a landless worker doing a day job as hired help on a ranch. We treat everyone with the same respect and try to infuse them with our passion for biodiversity. In this proposal we are focusing on a community that does not get much support: beekeepers. Over 90% place their hives on other people's land. It is very hard work and they are almost invisible in terms of representation. However, this is a group that needs native habitat and biodiversity to thrive. We have developed a wonderful strong relationship to create the certification and will be launching an app to engage them in our research.

In our education and outreach projects we reach the most remote schools providing them with new exciting materials and information. What we have found inspires them the most is when we share the stories of our day to day work, importance of studies and learning.

The Walt Disney Company through our project is promoting opportunities for a diversity of communities in a variety of remote places in 3 Brazilian biomes.

BUDGET template for DCF Inspiring Action Grants

Insert additional lines as needed. Please round each line item total to the closest \$100.

Please provide justification for requests either as a separate document, or within the "Justification" column.

Please save as a PDF document before uploading to your application in Cybergrants.

Disney Conservation Fund: Inspiring Action Grants

Date: 12/02/2021

Organization Name: Wild Animal Conservation Institute - ICAS

Project Title: Giant Armadillo Conservation Program- Saving the last populations of giant armadillos in the Cerrado

Granting Period: Note, if awarded funding, DCF funds will support activities starting in October of the current year. The grant term is two years.

Specific line values and Additional Funding Sources Redacted

Budget Category	Description	Unit Cost (USD)	Number of Units	Total (USD)	Requested Disney Support Year 1	Requested Disney Support Year 2	Secured from other Sources	Requested or to be requested from other sources	Justification Detail
Salaries									
Principal Investigator	Arnaud Desbiez - full time (12 months/year)	\$ /year	2 years						Sponsored by the Royal Zoological Society of Scotland.
Senior Veterinarian -	Danilo Kluyber Full time (12 months/year)	\$ /year	2 years						Sponsored by the Naples Zoo.
Biologist-	Gabriel Massocato Full time Pantanal (12 months/year)	\$ /year	2 years						Sponsored by the Houston Zoo
Biologist- Full time	Lucas Mendez (12 months/year) Atlantic Forest	\$ /year	2 years						Sponsored by Natural Research
Educator	Andreia Nasser Figueireido Full time (12 months/year)	\$ /year	2 years						Sponsored by the Reid Park Zoo
Junior field Biologist	To hired-for the Cerrado Full time (12 months/year)	\$ /year	2 years						After training this field biologist will be responsible for conducting the field work and extension work with the communities in the GACUs
Temporary Field Assistants	Temporary field assistants for all projects Pantanal, Cerrado, Atlantic forest GIS expert, weenmaster,	\$ /day	200 days/year						We always require field assistants to open, clear trails, process data, assist with field work
Project Consultants:	Editor, faciliator, extension worker to help train people in mitigation strategies, communicators	\$ / year	2 years						The project requires so much external expertise that we often hire experts for targeted work, data analysis or communication of results. This has been key to our success.
Subtotal salaries				\$249.000	\$5.000	\$5.000	\$197.000	\$42.000	
Travel expenses									
<i>Line item for each trip (including food and lodging per diem)</i>									
Fuel for Field Truck	Fuel for Field Truck Pantanal, Cerrado, Atlantic forest	\$/L	600 L per month for 2years						To get to field sites and to conduct work we require field trucks. We currently own two
Field Trucks Maintenance	Field Trucks Maintenance for two trucks	\$ per month per truck	24 months						Due to the conditions in the field, there is a LOT of wear and tear on the trucks. After each expedition we take the trucks to the mechanic.
Field Truck Annual Mechanical Revisions	Field Truck Annual Mechanical Revisions (both trucks/2 years)	\$ per year per truck	2 years						trucks under go a full check up annually. This is key to making sure we have less problems during the year.
Field Truck Insurance + License Taxes	Field Truck Insurance + License Taxes (Annual fee 1,800 each truck)	\$ per year per truck	2 years						Costs of taxes and insurance. The Royal Zoological Society of Scotland sponsors this cost.
Team transport	Bus/plane Transportation \$for members of the staff to come to Campo Grande from other cities of Brazil or for staff to visit staff in Atlantic forest in the Northeast of Brazil	\$/month	2 years						Not all team members live in Campo Grande. Furthermore the field site for the PERD in the Atlantic forest requires members from Campo Grande to travel to Vitoria. These costs are key to maintaining mobility between field sites.

Budget Category	Description	Unit Cost (USD)	Number of Units	Total (USD)	Requested Disney Support Year 1	Requested Disney Support Year 2	Secured from other Sources	Requested or to be requested from other sources	Justification Detail
Lodging & Per diem GACU	Lodging & Per diem (2- to 3 people field team) for GACU visits in Cerrado we stay in small budget hotels @ \$25//person	\$ //person	160 per diem per year for 2 years						<i>Costs of taxes and insurance. The Royal Zoological Society of Scotland sponsors this cost.</i>
Lodging & Per diem beekeeper	Lodging & Per diem (2- to 3 people field team) to visit beekeeper in Mato Grosso do Sul we stay in small budget hotels @ \$25//person	\$ //person	100 per diem per year for 2 years						<i>Lodging & Per diem to conduct field work in the Cerrado and select the GACU, conduct field work and community engagement. (field team)</i>
Lodging & Per diem Pantanal									<i>In the Pantanal we have free lodging and meals at the ranch. The Baia das Pedras ranch fully supports us.</i>
Lodging & Per diem Atlantic forest	In the Atlantic forest we have free lodging in the Parl but must pay for meals	\$ /year	2 years						<i>The Rio Doce state Park provided us with a house inside the Park. However we must purchase and make our own food.</i>
Subtotal travel expenses				\$56.620	\$6.250	\$6.250	\$15.400	\$28.720	
Field supplies									
<i>Line item for each category of items</i>									
Field Equipment for Cerrado, Atlantic forest and Pantanal	selebeam, walkie-talkies, VHF car radio, portable GPS unit, compass, flashlights, raincoats, boots etc.	\$ per year	2 years						<i>Typical field equipment that needs to be purchased and used at each field site. The GACUs will be a new team</i>
Field Supplies for cerrado and Pantanal	(notebooks, batteries, flagging tape, markers etc.)	\$ per year	2 years						<i>Typical field supplies that needs to be purchased and used at each field site. The GACUs will be a new team</i>
Camera-Trap -	Reconyx HC 500 USA @ 40 units (for Cerrado GACU Grids y), includes batteries and memory card.	\$ including camera, batteries and cards	40 units						<i>These camera traps will be purchased to create the new grid in the GACUs</i>
Telemetry Equipment -	Receiver TR-4 164 MHZ (Telonics USA) @ 1, Antenna RA-14 164 MHZ (Telonics USA) RW2 Coaxial Cables @ 3 units	\$ for all	1						<i>In the Pantanal our long term project uses telemetry to study the animals.</i>
Telemetry Equipment -	implant (IMP-410) @ 5 units per year	\$	10						<i>In the Pantanal our long term project uses telemetry to study the animals.</i>
Telemetry Equipment -	Custom made GPS tag @ 8units per year	\$	20						<i>In the Pantanal our long term project uses telemetry to study the animals.</i>
Anesthetic and Reversal Agents	Ketamin S+, Cloridrato de Diazepam: 1 a 5 mg/kg, Cloridrato de Xilazina: 1 mg/kg, Cloridrato de Yoimbina: 5 mg/kg, Cloridrato de Xilazina: 1 mg/kg, Cloridrato de Yoimbina: 5 mg/kg	\$ per year	2 years						<i>We capture and recapture giant armadillos in the Pantanal to place telemetry devices. We will not be conducting captures at our other field sites.</i>

Budget Category	Description	Unit Cost (USD)	Number of Units	Total (USD)	Requested Disney Support Year 1	Requested Disney Support Year 2	Secured from other Sources	Requested or to be requested from other sources	Justification Detail
Veterinary Equipment	Stethoscope, Speculum, Digital Thermometer clinical high-sensitivity, Basic Surgical Material, Punch Biopsy, Pliers and tags for marking, Collection tubes (200 units), Swabs for microbiology (100), Syringes and Needles	\$ per year	2 years						We capture and recapture giant armadillos in the Pantanal to place telemetry devices. We will not be conducting captures at our other field sites.
Subtotal field supplies				\$56.700	\$10.250	\$10.250	\$7.200	\$29.000	
Meetings & workshop expenses									
<i>Line item for each meeting/workshop</i>									
Education and community outreach meetings	Team travel and per diem for armadillo meetings and presentations to schools and stakeholders throughout Mato Grosso do Sul, but especially in the GACUs	\$ per year	2 years						We plan to work in 200 schools in Mato Grosso do Sul to implement a Giant armadillo campaign which we are always updating. All schools in the GACUs will be selected to participate. (these are the costs for the education team, interns and volunteers that participate in the project)
Outreach with beekeepers	Ttravel and per diem and workshop organizing to present certification	\$ per year	2 years						We have found that participating in beekeeper association meetings has been key to creating a strong relationship with the community of beekeepers and helps us to promote the certifaicon.
Subtotal meetings & workshop expenses				\$9.000	\$2.750	\$2.750	\$0	\$3.500	
Capital expenses									
<i>Line item for each expense \$20,000 or more (building infrastructure, vehicles, etc.)</i>	None	0	0	0	0	0	0	0	No capital expenses are planned. We own our vehicles and do not plan to replace them.
Subtotal capital expenses									
Miscellaneous									
<i>Line item for each misc item (lab services, materials, printing, etc)</i>									
Education & outreach	updates of Teacher Manual (preparation, printing and recording You Tube Chanel)	\$ per year	2 years						These expense are for all the materials we need to update our campaign which is also available virtually
Education & outreach	Printing of materials, books and activities for GACUs schools	\$ per year	2 years						Printing fees
Citizen Science app for beekeepers	Hiring company to create the APP	\$	1						To engage with beekeepers we are creating an APP where the register the presence, damage or signs of giant armadillos. The Stuggart Zoo is sponsoring this expense.
Outreach	Printing of 80 posters design for Citizen Science work (hard plastic material)	\$ per year	2 years						These durable posters are key to our conservation work in the Cerrado and help us to engage with the community.
Subtotal miscellaneous				\$16.300	\$750	\$750	\$11.600	\$3.200	
Subtotal									
Indirect Costs/Overhead (total not to exceed 10%)									No overhead. The Naples ZOO inc. Will be sending all the funds to our program
Total				\$387.620	\$25.000	\$25.000	\$231.200	\$106.420	

Name **Desbiez, Arnaud Léonard Jean**

Address **PERSONAL**
Phone **INFORMATION**
E-mail **REDACTED**
Citizenship
Date of Birth

EDUCATION

1993	High School	Lycée Notre Dame, Saint Germain en Laye, France (Baccalaureat serie D)
1995-1998	University	B.Sc. Major: Zoology, Minor: International Development McGill University, Montreal, Canada Final project: The effects of deforestation on a troop of black howler monkeys in the Community Baboon Sanctuary, Belize, Central America
2000-2002	Masters Degree	M.Sc. Natural Resource Management, Cranfield University, Silsoe, United Kingdom Thesis title: Perception and assessment of soil fertility by farmers in the mid hills of Nepal
2002-2007	Ph.D. Degree	Ph.D. Biodiversity Management Program University of Kent, Canterbury, United Kingdom Durrell Institute of Conservation and Ecology (DICE) Thesis title: Habitat alteration, invasive species and bushmeat hunting in the Brazilian Pantanal

CURRENT POSITIONS

2016- current	Founder and President, ICAS – Instituto de Conservação de Animais Silvestres
2009- current	Professor Escola Superior de Conservação Ambiental e Sustentabilidade, Nazaré, São Paulo
2005- current	Convener, CBSG-Brasil, Conservation Breeding Specialist Group (CBSG)- Brasil Regional Network International Union for the Conservation of Nature (IUCN) Species Survival Commission (SSC)

Selected publications

Desbiez, A.L.J. and Kluwyber, D. **2013**. The role of giant armadillos as ecosystem engineers. **Biotropica**. 45(5):537-540

Desbiez, A.L.J., Massocato, G.F., Kluwyber, D. and Santos, R.C.F. **2018**. Unravelling the cryptic life of the southern naked-tailed armadillo, *Cabassous unicinctus squamicaudis* (Lund, 1845), in a Neotropical wetland: Home range, activity pattern, burrow use and reproductive behaviour. *Mammalian Biology*. 91: 95-103.

Desbiez, A.L.J., Massocato, G.F., Kluwyber, D. Do Nascimento Luba, C and Attias, N. **2019**. How giant are giant armadillos? The morphometry of giant armadillos (*Priodontes maximus* Kerr, 1792) in the Pantanal of Brazil. *Mammalian Biology*. 95: 9-14.

Desbiez, A.L.J., Massocato, G.F., Kluwyber, D. **2020**. Insights in Giant Armadillo (*Priodontes maximus* Kerr, 1792) reproduction. *Mammalia*. 84(3): 283-293

Desbiez, A.L.J., Massocato, G.F., Kluwyber, D., Oliveira-Santos LGR and Attias, N. **2020**. Spatial ecology of the giant armadillo (*Priodontes maximus*) in Midwestern Brazil. *Journal of Mammalogy*. 101 (1) 151-163.

Desbiez, A.L.J.; Bertassoni, A. and Traylor-Holzer, K. 2020. Population Viability Analysis as a tool for giant anteater conservation. *Perspectives in Ecology and Conservation*. 18: 124-131

Ferraz, K.M.,P.M.B. Oliveira, B., Attias N., **Desbiez, A.L.J.** **2021**. Species distribution model reveals only highly fragmented suitable patches remaining for giant armadillo in the Brazilian Cerrado. *Perspectives in Ecology and Conservation*. In press.

Past Professional Experience

- 2017- Current** Founder and Project Coordinator for the Anteaters & Highways program
- 2010- Current** Founder and Project coordinator for the Giant Armadillo Conservation Program
- 2007-2010** EMBRAPA-Pantanal - Brazilian Agricultural Research Corporation, Corumba, Brazil
Creation of an interactive illustrated key based on Delta software for the analysis of fecal micro-histological slides of herbivores in the Pantanal. Visiting Scientist.
- 2002-2007** Durrell Institute of Conservation and Ecology, Canterbury, UK
EMBRAPA-Pantanal - Brazilian Agricultural Research Corporation, Corumba, Brazil
Responsible for Brazilian Pantanal work package 5 of European Union INCO PECARI "Development of different production systems for the sustainable exploitation of the collared peccary (*Tayassu tajacu*) in Latin America". Research Associate
- 2001** Lumle Agricultural Research Station, Pokhara, Nepal/DFID
Research on soil fertility Participatory Rural Appraisal. M.Sc. Candidate (June-November)
- 2000-2001** SAFAD (Silsoe Aid For Appropriate Development) Student run charity, UK.
Technical and logistical support of agro-forestry projects in rural areas of Guatemala. Volunteer: Project Appraisal Officer (October 2000 - June 2001)
- 2000** CIDOB/DFID Biological Investigation Project, Santa Cruz, Bolivia
Trained and assisted indigenous communities (Ayoreo) in participatory biological investigation projects aimed at drafting management plans for sustainable use of natural resources. Scientific and Technical Advisor
- 1999-2000** Universidad de Bahia Blanca, Argentina
Pampas fox population dynamics study. Volunteer Trainee
Reserva Campo del Tuyu: Geoffroys cat ecology study. Volunteer Trainee
- 1999** WildCru, Oxford University, United Kingdom
North Nibley Badger Project. Research Assistant
Thames River American Mink Project. Research Assistant
- 1997** Community Baboon Sanctuary, Belize, Central America
Study on the effects of deforestation on black howler monkeys. Trainee
- 1992-1998** Parc Zoologique CERZA, France
Zoo Keeper / Assistant Curator, (Several periods of work between December 1992 and November 1998)
- 1992** Thoiry Safari Park, France Zoo Keeper (summer work)

Professional referees

- Bengt Holst** Vice Director & Director of Conservation and Science, Copenhagen Zoo
- Bob Lacy** Population Biologist, Chicago Zoological Society